PACKAGE engineering

How moisture can affect dry food packaging

Taking a simplified look at some basic points of the physical chemistry of solution to understand why moisture pickup by a dry food depends largely on relative humidity. (See Page 33)

Production line running of plastic bottles

Stresses proper storage and handling, correct feed, the right guide rail settings and proper adjustment to avoid excess pressure, adequate gripper pressure when capping, and careful use of change parts. (See Page 38)

Packaging needs require long range planning

Reviewing the importance of thinking in terms of longer intervals than the now-outmoded one-year budget period and of developing articulate plans for these longer intervals. (See Page 59)

Complete table of contents on Page 2

SEPTEMBER 1959

How to change the course of your business with the right change in packaging

Naturally, that's what you'd like to do ... the question is HOW? The answer could be right in this label

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For more information circle No. 201 on Reader Service Card, Page 79

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For your calendar

September 13-16. Produce Packaging Association's national convention and exposition, Sheraton Hotel, Philadelphia, Penna. Contact: Robert L. Carey, executive secretary, Produce Packaging Association, South College Avenue, R. D. 2, Newark, Del. *Telephone: ENdicott 8-2906.*

September 21-23. AMA orientation seminar, "How to set up and manage an economical fill control program," The Hotel Astor, New York, N. Y. Contact: John L. Wood, American Management Association, 1515 Broadway, New York 36, N. Y. *Telephone: JUdson 6-8100.*

October 1. Packaging Institute professional member meeting on packaging of dairy products, Sheraton-Blackstone Hotel, Chicago. Contact: Charles A. Feld, executive director, Packaging Institute, 342 Madison Avenue, New York 17, N. Y. *Telephone: MUrray Hill 7-8875.*

October 5-6. Purdue University conference on packaging specifications, Purdue University, Lafayette, Ind. Contact: Mark E. Ocker, Division of Adult Education, Memorial Center, Purdue University, Lafayette, Ind. *Telephone: 92-2533.*

October 16-25. 13th French Packaging Show, Palace of the National Industrial and Technical Centre, Paris, France. Contact: Pierre J. Louis, Institut Francais de L'emballage et du Conditionnement, 3 Rue La Boetie, Paris 8, France. *Telephone: ANjou 68-48-72-56.*

October 19-20. 9th French Packaging Congress, Palace of the National Industrial and Technical Centre, Paris, France. Contact: Pierre J. Louis, Institut Francais de L'emballage et du Conditionnement, 3 Rue La Boetie, Paris 8, France. *Telephone: ANjou 68-48-72-56.*

October 29-30. Industrial Packaging Institute, The University of Wisconsin, Extension Division, Wisconsin Center Building, Madison, Wisconsin. Contact: Richard A. McCormick, Institute Coordinator, Department of Engineering, The University of Wisconsin, Madison, Wisconsin. *Telephone: ALpine 5-2211, Ext. 4513.*

November 16-18. 21st annual national packaging forum of Packaging Institute, Hotel Statler, New York, N. Y. Contact: Charles A. Feld, executive director, Packaging Institute, 342 Madison Avenue, New York 17, N. Y. *Telephone: MUrray Hill 7-8875.*

November 17-20. Packaging Machinery Manufacturers Institute Show, New York Coliseum, New York. Contact: Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22, Pa. *Telephone: ATlantic 1-8552.*

SEPTEMBER 1959 • VOLUME 4 • NUMBER 9

PACKAGE engineering

AN ANGUS J. RAY PUBLICATION

Articles

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Reviewing theories and principles of the physical chemistry of solution—interpreted in light of moisture pickup and relative humidity.

38 Techniques of running plastic bottles on a multi-purpose line, by Irvin W. Combs, packaging engineer, Plough, Inc.

Stressing special problems of excess pressure on bottles, correct feed-in, gripper adjustment, as well as change-part handling.

42 How management develops people to adjust and maintain machinery, by William R. Fieroh, superintendent, I. J. Grass Noodle Company

Spotlighting the application of "human relations" to maintain operating conditions for peak production—and identifying and developing people to do this.

44 What a machinery adjuster should know—and do, by Michael Dizonno, night foreman, I. J. Grass Noodle Company

Emphasizing importance of getting the package correctly started through machinery and then listening for the right production line sounds.

48 Oriented polystyrene sheet, by Merlin L. Evans, development engineer, Plax Corporation

Second part of a two-part article, stressing (in this part) thermoforming, vacuum, pressure and mechanical forming.

53 Control net weight by taring each container, by Thomas T. Polke, quality control engineer, The Dow Chemical Company

Using a standard dial scale with added special "sectors" permits rapid weighing, avoids errors found with average tare and standard gross weights.

59 Are you ready for long range planning?

Pointing out the need of longer planning intervals (one-year budgets being outmoded) and thinking in articulate terms of packaging expenditures for them.

64 Vacuum system frees packaging line of spilled beans, by Dean A. Broadhead, vice president, N. K. Hurst Company

Enumerating savings and advantages of a vacuum pickup method with a collector on each line—and a (central) exhauster.

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Our December, 1959 issue will carry a cumulative editorial index for the year listing our feature articles by subject, author, and other headings.

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A note from the Publisher

More on packaging machinery

In response to the observations made in the July "A note from the Publisher" column comparing American- and European-built packaging machinery, we received quite a few letters and phone calls, pro and con. This month, we are printing excerpts from just a few of the letters (starting on Page 6), since our editorial pages are open to everyone and we sincerely hope our readers will always register their opinions, whether in agreement or not.

Most people do agree, however, that there are few ideas on any subject that are either completely right or completely wrong. For instance, I don't think, and perhaps some will disagree, that there is a perfect package. If it is perfect in what it will do, it probably will be imperfect in what it will cost. In any event, to arrive at a sound conclusion, all sides of a question should be explored, and therefore we appreciate your interest.

My opinions on this subject of American and European machinery have been formed over a period of 15 years' close association with the packaging field, and I believe that in the majority of cases a piece of American equipment will do the better job. However, many American manufacturers are looking abroad for equipment to import and sell in this country, just as European manufacturers are looking here to import and sell American machinery abroad.

One fact is obvious—the competition is increasing daily, and the one mistake the American machinery manufacturers cannot afford to make is to complacently assume that because they are leading the field now, the situation will remain unchanged.

Angus J. Ray

Publisher

PACKAGE engineering

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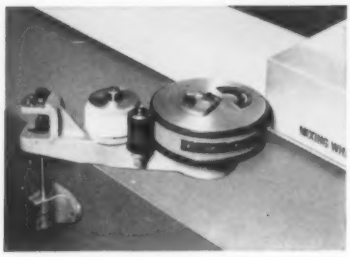

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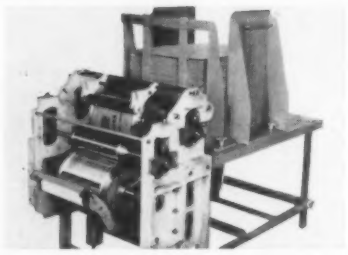

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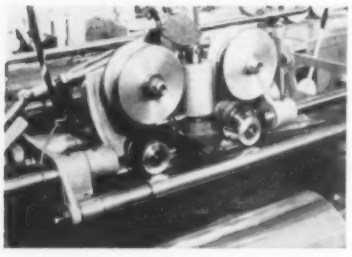

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Letters to PACKAGE engineering

Re: American and foreign packaging machinery

Gentlemen:

Perhaps it is a good thing to register some differences of opinion once in awhile so people in the publishing business will know your periodicals are read and enjoyed. I would like to register some differences to statements in "A note from the Publisher," July, 1959 PACKAGE ENGINEERING.

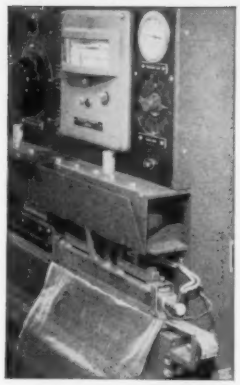
We have found there has been a strong influx of good foreign-made packaging machinery available which has gained momentum over the past seven to eight years, and our company has attempted to take every advantage of the situation.

We have found there is still somewhat more specialization among the American manufacturers than abroad, but this gap is closing rapidly, and we take a serious look for any foreign-made machines for each packaging machine requirement as it comes up.

We have not found the inventory of repair parts is any problem on foreign machines even though we maintain only a small inventory of frequently changed parts. There have been a few isolated instances where in emergency something has had to be shipped in by air, but we have obtained delivery almost as quickly as we could from an American supplier.

(Turn page)

DELIVERING MOST OF THE BEST–



The heat seal test is one of the many film tests that assures high performance from packaging film made of Monsanto polyethylene resins. An instrumented heat-sealer controls pressure, time and temperature. The most dependable seals are made on film extruded from 706!

Polyethylene packaging film based on "tested-best" Monsanto Polyethylene 706 Resin

No question about it—polyethylene film delivers what industrial packaging must have—great tear-resistance, smooth finish, inertness to chemicals, moisture resistance, flexibility and toughness unaffected by low temperatures. And test after test proves that polyethylene film extruded from Monsanto 706 delivers best.

Specifically developed for industrial films, 706 resin produces films that heat-seal consistently and positively. These films provide great impact strength, excellent openability, and uniform translucent appearance.

For the most dependable packaging performance, order polyethylene bags and liners based on 706, the Monsanto resin that "tests best!" Write for names of converters and suppliers, to Monsanto Chemical Company, Plastics Division, Rm. 1004, Springfield 2, Massachusetts.

Monsanto

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Just "touch" the carton and there's your label

Weber Touch-Stenciling—the fast easy way to address multiple carton shipments...

No more stencilboards, rubber stamps or label typing. Instead, you can print facsimile labels directly on cartons with just a "touch" of a Web-O-Print hand duplicator.

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We feel the stimulus of foreign competition will prove to be a good thing for American manufacturers. I hope it is recognized that this competition is getting sharper every day, not only from the standpoint of equipment but from the caliber of agents in the U. S. who are selling foreign-made machines. We feel there has been a definite improvement in this area over the past few years.

G. M. Woodruff
Manager
Equipment Development Service
General Foods Corp.
Port Chester, N. Y.

Gentlemen:

In my opinion "A note from the Publisher" lacks any substantial foundation in fact.

Much of the European equipment sells for prices equivalent, or higher, than similar types of domestic-built equipment, but its performance justifies this increased price. There is no question that the lower labor rates in Europe permit the European machinery producer to put into his equipment far more man-hours in detail finishing for the price. More important, however, is that European engineering has in the past few years awakened to the growing international packaging markets and has applied creative thinking to their development. The outcome has resulted in a substantial invasion of the U. S. market by machines which have been well engineered.

As to service and parts, I can testify from long personal experience, which can be borne out if you will take the trouble to check with ten or fifteen large packagers, that for the most part, the manufacturers of American packaging machinery do not carry an adequate stock of spare parts on hand, and if the packager himself does not maintain inventories of wearing parts, it takes from six to fifteen weeks to secure replacements. This is not an isolated instance, but the rule rather than the exception.

(Turn page)

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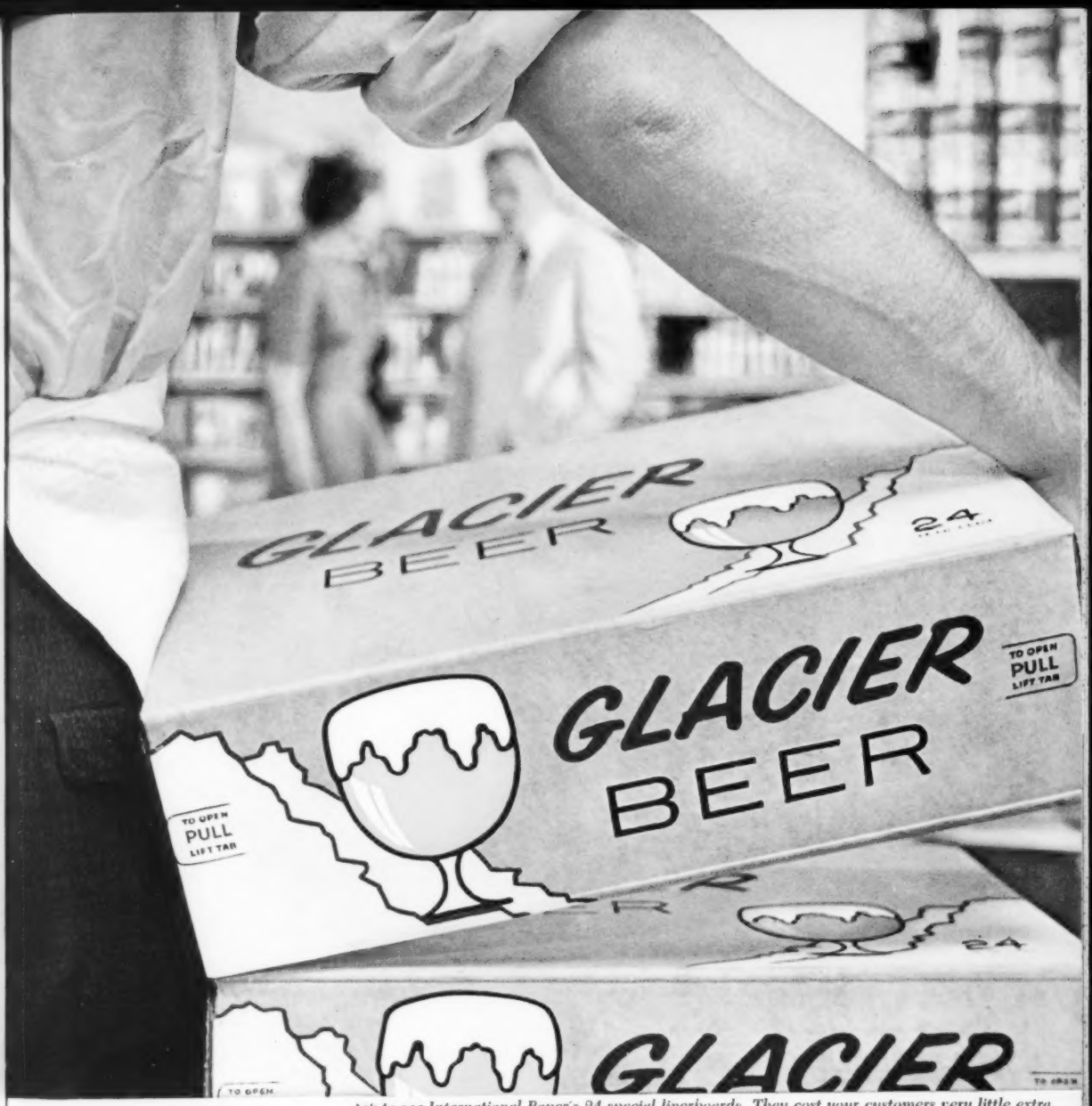

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See how new Coralkraft by International Paper makes your customers' containers stand out and sell their brand

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Ask your International Paper representative to show you samples of this new selection of linerboards that dress up your customers' containers at surprisingly low cost. Or write to us direct.

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It is not my intention to overflatter European machinery indiscriminately, for I am fully aware of the fact that much foreign-made equipment is inadequate for U. S. manufacturing procedure. This is also true of equipment made by U. S. machinery manufacturers. In most instances, you will find that responsible foreign producers of quality machinery have wide representation in the U. S., and their U. S. agents are fully prepared and equipped to provide adequate service.

Almost every major packaging machinery manufacturer in this country has scouts abroad seeking out new developments in the European market, and a good many of them are financing the development of new machinery overseas.

Our U. S.-produced machinery does not require any apologists. Much of it is well engineered and well built. However, a great deal of it was designed ten or fifteen or twenty years ago and has been modified rather than redesigned for the newer jobs at hand. Where foreign equipment is making inroads, it is primarily due to superior foreign equipment design, better speeds and greater flexibility rather than lower cost.

C. M. Leeds
Custom Packaging Division
Leedpak, Inc.
New York

Gentlemen:

Personally, I believe your editorial is founded on facts.

K. M. Peterson
Advertising Manager
Pneumatic Scale Corp., Ltd.
Quincy, Mass.

Gentlemen:

I believe that you are familiar with one trend that seems to be gaining momentum, namely, the spiraling cost to manufacture in the U. S., which is leading many of our friends in the PMMI to consider manufacturing their machines or basic components of these machines abroad and then import

Space-Saving Tray Elevator Boosts Mueller Production!

Because this Robo-Lift Tray Elevator ascends straight up, C. F. Mueller Co., Jersey City, increased production without costly remodeling. To cope with stepped-up consumer demand, the nation's largest macaroni manufacturer rearranged and increased the capacity of its product weighing, packaging, cartoning and sealing operations. To hike the output, engineers placed the automatic sealing unit high above floor level. However, due to cramped quarters, a vertical elevator was needed to carry product-filled cartons to the sealer.

Only the Lynch Robo-Lift Tray Elevator met all requirements and specifications.

Space-saving and jam-proof, the automatic upright operates a sixteen-hour shift, handling cartons at the prescribed rate of six-per-minute. Featuring unique infeed and discharge systems, the elevator cannot jam —ever. And, unlike bar and belt-type models, it doesn't mar or rub a carton's printed message. Through fixed positioning of trays, pendulum action is eliminated and cartons ride safe, secure, easy.

Robo-Lift Tray Elevators are available for a variety of lifting or *lowering* assignments. For full details on how Tray Elevators serve, request free literature, today.

Write for illustrated booklet which details the complete story titled, "LYNCH Robo-Lift Tray Elevator . . . moves cartons vertically, saves time, money, floor space at C. F. Mueller Company."

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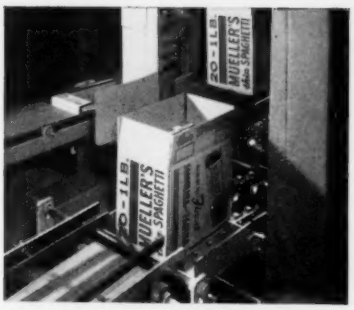
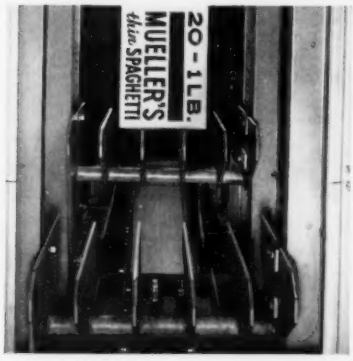
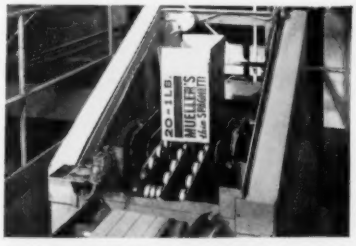


Close-up shows a filled carton beginning its gentle Tray Elevator ride upward. In the foreground, the next carton in line has moved off conveyor belt and is automatically held back until oncoming tray appears.



Moving straight up, the carton rests on a fixed, non-pendulum tray that neither swings nor sways . . . always holds carton steady, secure. Note how carton's open end bottom is held in a closed position until it reaches the sealing unit.



Just beneath the room's ceiling, the carton leaves the tray via rollers. Conveyor belt then takes over, moving carton through the sealing operation. Although a six-per-minute schedule is timed here, the elevator can move up to 15 cartons every minute.

LYNCH
CORPORATION
Anderson, Indiana

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packaging wire to meet modern requirements

MID-STATES STITCHING WIRE

gives you frictionless, uniformly smooth flow off the coil and through the stitching head to assure high-speed, uinterrupted operation. Available in 5, 10, 25 and 50-lb. coils. All standard gauges. Special gauges on request. Galvanized and copper-coated finishes.

ALSO wires for a wide variety of uses such as tying, baling, binding, stapling, et cetera. A complete line of cost-savers to meet every packaging requirement. Write today for further deatils, samples and prices.

MS SW MID-STATES STEEL & WIRE COMPANY

MID-STATES STEEL & WIRE COMPANY
CRAWFORDSVILLE, INDIANA • JACKSONVILLE, FLORIDA

them to this country for assembling and testing prior to installing them in American plants.

The "Common Market" programs in the works in Europe are an added incentive to manufacture abroad so that I foresee every major producer of packaging equipment in the U. S. with some sort of foreign plant or affiliation within the next five years (ourselves included).

W. B. Bronander, Jr.
President
Scandia Packaging Machinery Co.
North Arlington, N. J.

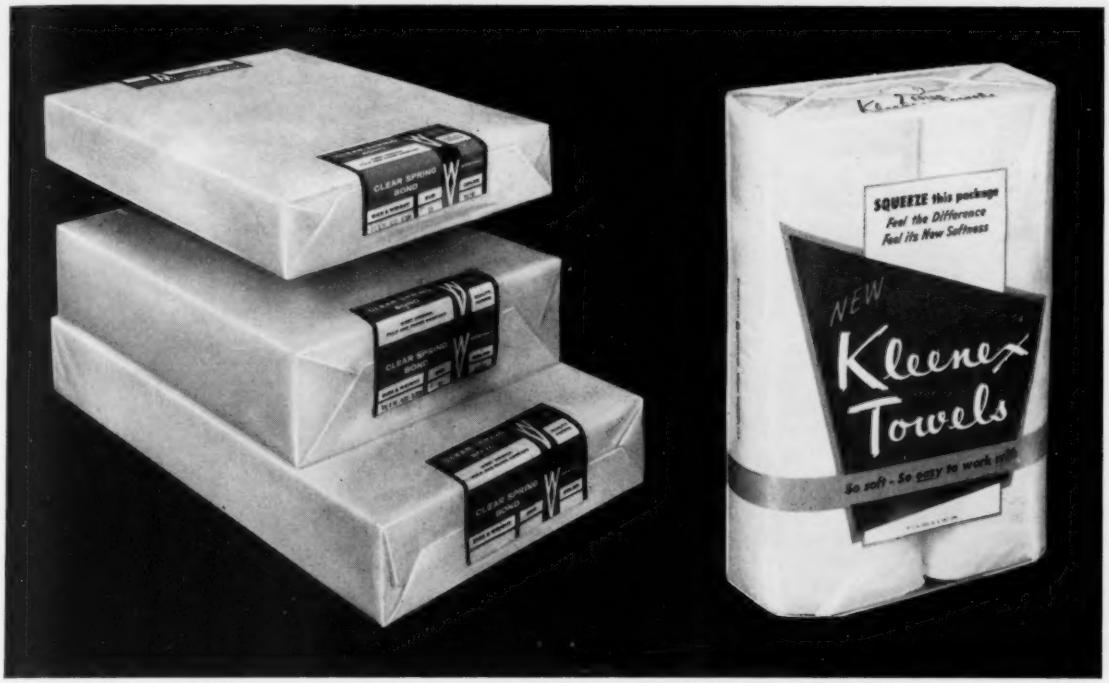
Gentlemen:

There is no question but that many of our large domestic packaging machinery users are becoming vitally interested in foreign equipment—and this is as it should be. However, I do think that we are often completely overwhelmed by the lower labor costs in foreign countries and fail to realize some of the hidden costs in foreign equipment such as those to which you refer in your editorial.

Our company does not mind good hard competition from anyone, but it is very difficult, if not downright frustrating, to try to convince someone that the long-range cost of a foreign packaging machine in some cases would be considered prohibitive if it were the actual cost being considered at the time of purchase. There are some excellent foreign machines on the market, and in some cases they are better than any you can buy in this country. However, hasty or ill considered purchase of foreign machinery on the basis of either a lower cost or a highly specialized application, such as you discuss, is certainly not in the best interest of the man who needs an automatic packaging machine.

William W. Anthony, Jr.
Executive Vice President and
General Manager
Crompton & Knowles
Packaging Corp.
Holyoke, Mass.

(End)



With the PACKAGE U-7 you get

COMPLETE FLEXIBILITY

in wrapping materials and package sizes

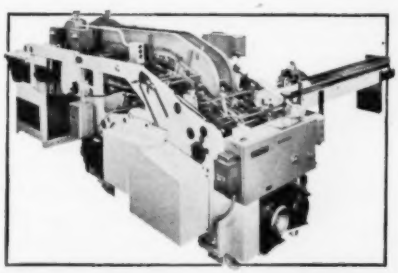
Here's the PACKAGE U-7—a machine versatile enough to provide the new, attractive, yet economical packaging necessary today. The Model U-7 offers a wrapping and bundling speed up to 50 packages a minute, with change-overs between package sizes that require only minutes. Its flexibility in wrapping materials, package sizes and shapes, has been a deciding factor in its use by Kimberly-Clark and West Virginia Pulp and Paper Company.

Polyethylene wrapping for Kleenex towels has provided an important merchandising extra for Kimberly-Clark. The printed polyethylene wrapper invites the shopper to "squeeze the package and feel the difference, feel the new softness."

Polyethylene wrapping contributes to reduced packaging costs and increases shelf life of the product.

For wrapping different size packages of bond paper, the U-7 has provided West Virginia with a two-fold savings. The U-7 wraps packages that vary in height from ½ inch to 2½ inches, and uses the same size thermoplastic identification labels on *all* the different package sizes. Advanced engineering of the U-7 makes this double saving possible.

For rugged, efficient, trouble-free operation, no machine can match the U-7. Call your PACKAGE representative and get all the facts about this versatile machine for wrapping or bundling, and how it can add to your packaging profit.



Outstanding features of the PACKAGE U-7. Models are available to wrap with polyethylene, any plain or heat-sealing material, or sulphite paper and glue. Self-measuring paper feed saves on wrapping material. Electric eye registration (optional). Sealed ball bearings eliminate lubrication, cut maintenance. Single handwheel gives quick width adjustment. Motorized package length control is easier to operate.

PACKAGING IS PART OF YOUR PROFIT PICTURE

PACKAGE MACHINERY COMPANY, EAST LONGMEADOW, MASS.

NEW YORK • PHILADELPHIA • ATLANTA • BOSTON • CLEVELAND • CHICAGO • KANSAS CITY
DALLAS • DENVER • LOS ANGELES • SAN FRANCISCO • SEATTLE • TORONTO • MEXICO CITY

PACKAGE

The PULSE / of packaging

Packaging across the seas:

European Packaging Federation says its "Eurostar 1959" competition is proving an increasingly important incentive to improve packages, material, and methods in the various European countries, notes that only packages winning national awards in their own countries are eligible to compete. Protection, convenience, originality, construction, good use of new materials and economy of production are among important points considered.

Italy's **Istituto Italiano Imballaggio** has already announced 15 packages winning its "Oscars for Packaging 1959." These include an anodized aluminum aerosol bottle, a polyethylene petroleum container, a paperboard and aluminum folding carton for chocolate drops, and a tinplate can for rice having with it a polypropylene bag for sauce accompanying the rice . . . Sponsors of the forthcoming **French Packaging Show** predict an attendance of 150,000, say that 120,000 manufacturers from all over Europe and other parts of the world visited last year's show. We hear this year's show will exhibit a new range of barrier and laminated materials, as well as latest techniques in metal conversion for packaging.

Italy's first aerosol-packaged pharmaceutical, Dermomixin, a bactericide, is packaged in the first plastic-coated glass aerosol bottle manufactured in Italy, according to **Solfrene, S.p.A.** of Milan, maker of this bottle . . . **Rheem Manufacturing Co.** is equipping a plant at Maipu, Chile, expected to use 5,000 tons of Chilean steel annually to make shipping containers.

Aluminum Co. of America says its international division has acquired an interest in **Tapas y Envases, S.A. de C.V.,** a Mexico City maker of bottle caps and seals . . . The **India Plastics Industry** study team recently spent a month in the U. S. getting information on technological advances, production methods, and industrial management from various American plastics plants . . . **Celanese Corp. of America** has established Celanese Development Co. to evaluate potential new marketing areas and expansion for Celanese and its foreign affiliates.

E. W. Bliss Co.'s container machinery division is equipping a metal can manufacturing plant now being built in the Philippine Islands by **The Standard Investment Corp. of Manila . . . Dow Chemical International Ltd. S.A.** now has a new sales office in Johannesburg, Union of South Africa.

Trends to watch:

Assuming present rates of production continue through 1959, total shipments of corrugated and solid fibre boxes will reach 108,000,000,000 sq. ft., an 11 per cent increase over the previous record of 1956, according to **Fibre Box Association.** Box shipments for the first six months of this year ran 15.9 per cent above those of the same period last year, the group notes . . . **National Paperboard Association** predicts a record production of 15,900,000 tons of paperboard, if the present rate continues through 1959.

Giant rubber bands measuring up to 6 ft. long and stretching to 18 ft. now serve to hold cartons and cases together in piles or on pallets, according to **The B. F. Goodrich Co.** . . . We hear that Canadian and American brewers now use tear-string closures for cartons and cases to ship packaged beer to restaurants, taverns and hotels.

Groups in the news:

Pressure Sensitive Tape Council has completed and made available a series of 13 test methods and procedures for testing pressure-sensitive tapes. These are available from tape manufacturers or the council . . . **Produce Packaging Association** has been making a study of trends, future developments, and long-range planning, plans to tabulate and report on its findings at its forthcoming convention.

International Association of Ice Cream Manufacturers, Paraffined Carton Research Council, and filling machine manufacturers have agreed on a standardized design for pint and half-gallon rectangular ice cream cartons. This program, calculated to permit interchangeability of cartons from different carton makers, has been submitted to the Commodity Standards Div. of the Department of Commerce for promulgation as a simplified practice recommendation.

Active with an educational program showing the proper use, and not misuse, of ultrathin plastic film, **The Society of the Plastics Industry, Inc.** points out that the flexible packaging normally used for textile and food products (gauge 0.00125 in. or more) should not be confused with ultrathin materials of 0.0004 to 0.0006 in. used to protect freshly cleaned clothes. It says education rather than legislation is the way to combat misuse of the thin material, says that deaths of infants occurred primarily when ultrathin plastic came in contact with their faces through its improper use as a crib or mattress cover, rather than from suffocation due to children pulling thin bags over their heads while playing.

Society of Packaging and Handling Engineers is finalizing plans for a renewal of its packaging and handling competition and reports that its national education committee will soon embark on several projects aimed at "assuring an adequate supply of trained packaging and handling technicians."

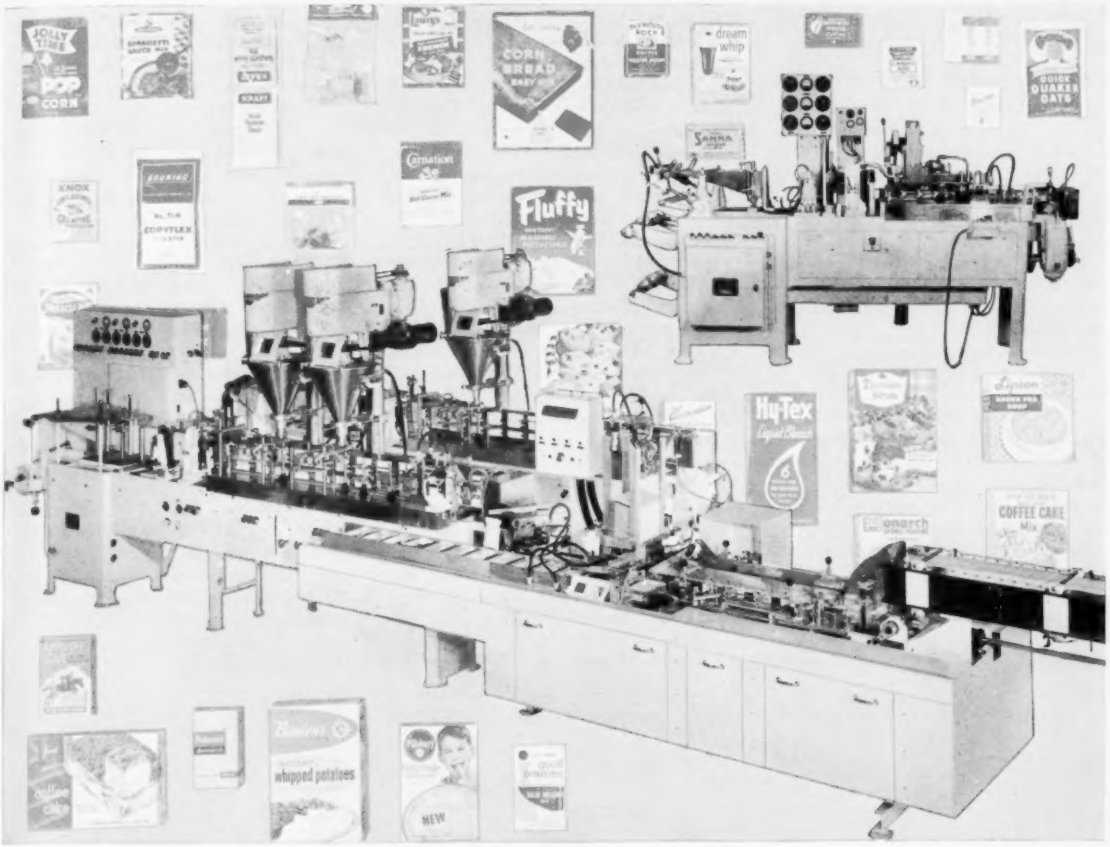
Packaging Institute plans a new feature in connection with its forthcoming national packaging forum: a multiple-use registration ticket permitting each day's ticket to be used by as many as three different persons from one company, and by as many as nine from those buying three-day tickets. New at PI: To expand its service to PI members and the packaging field, it has added a membership coordinator (Richard T. Walsh) to its staff.

Notes from the government:

Air Materiel Command (of the USAF) has launched Project "Safe-Ship" involving a full-time work group of AMC personnel to cut shipping damage to valuable defense cargo. It conservatively estimates military damage claims to cargo in transit at $175,000,000, says first phase of the project will be an educational program stressing good methods . . . We hear that the **Navy's Bureau of Aeronautics** has prepared a new specification, MIL-F-22019 (Aer) for film, and MIL-B-22020 (Aer) for bags—of transparent packaging film using invisible inhibitors, designed to permit examining and identifying of packaged items without unwrapping them.

For $0.35 a copy, the Government Printing Office (Washington 25, D. C.) will sell you a 27-page publication entitled "Checking prepackaged commodities," by Malcolm W. Jensen of **National Bureau of Standard's Office of Weights and Measures.** Scale manufacturers say this is "must" reading for packagers and processors . . . **Commod-**

There is No Substitute for...Dependability!



FOR LARGE JOBS OR SMALL...

BARTELT MACHINES ARE A SOUND INVESTMENT!

You Can *Depend* on Bartelt for:

- **Quality Output** — Superior seal strength, high filling accuracy and minimum package distortion assure the highest package quality.
- **Versatility** — Designed for fast change-overs as well as a wide range of package sizes and types; Bartelt versatility is unmatched.
- **Rugged Reliability** — Bartelt machinery has repeatedly been proven capable of meeting the highest production requirements.
- **Minimum Upkeep** — The simplicity, accessability and ruggedness of Bartelt equipment assures minimum maintenance costs.
- **Custom Design** — Each Bartelt machine is designed to meet the customer's specific requirements.

Where unfailing quality counts . . . Bartelt!

"Machinery for Creative Packaging"

BARTELT ENGINEERING COMPANY

1900 HARRISON AVE., ROCKFORD, ILLINOIS, NEW YORK OFFICE: 370 LEXINGTON AVE., N.Y.C.

ity Standards Div. of the Department of Commerce says that the Superintendent of Documents, Government Printing Office, now has available a third edition of simplified practice recommendation R-44-59 for boxboard thicknesses, $0.10 a copy.

More expansion for packaging:

National Plastic Films, Inc., Ottawa, Kan., (a new firm beginning operations August 1) expects to produce 1,000,000 lb./yr. of polyethylene by chill roll casting . . . . **Horix Manufacturing Co.** has acquired **Canning Machinery Co.**, Portland, Ore. . . . As part of its $5,000,000 expansion program, **Aluminum Co. of America** will install a 5,200-ton capacity extrusion press at its Vernon, Calif. works.

Diamond Gardner Corp. and **The U. S. Printing & Lithograph Co.** plan to merge . . . Three new folding carton sales offices—Leonia, N. J., Needham, Mass. and Pittsburgh—have been opened by **Continental Can Co.** . . . **Mobay Chemical Co.**'s new facilities in New Martinsville, W. Va. will manufacture polycarbonate plastic resins.

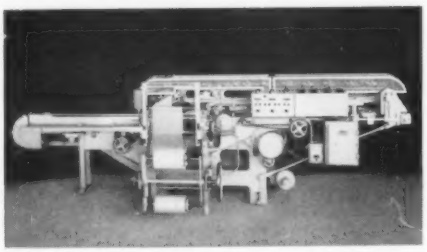
Gilbert Manufacturing Co., Inc.'s expansion program will make its productive capacity total over 70,000 sq. ft. . . . **American Box Board Co.**, **Central Fibre Products Co.** and **The Ohio Boxboard Co.** have merged to form **Packaging Corp. of America** . . . **Amoco Chemicals Corp.** will build a plant at Joliet to manufacture high impact and conventional polystyrene.

Pyrometer Co. of America, Inc., Penndel, Penna., has formed a new division, Pycofoam, for custom molding of expandable polystyrene . . . To increase production facilities, **Arthur Colton Co.** plans to build a new plant in Elk Rapids, Mich.

Standard Packaging Corp.'s expenditure program includes acquisition of 21 acres and 77,000-sq. ft. building in Fort Wayne for its Royal Lace Paper Div. . . . **Injection Molding Co.** (IMCO) has been acquired by the **Rexall Drug and Chemical Co.** . . . **Celanese Corp. of America** has organized three new companies—Celanese Fibers Co., Celanese Chemical Co. and Celanese Plastics Co.

Fibreboard Paper Products Corp. will build a shipping container plant in Phoenix . . . **The Dobeckmun Co.** has moved its sales headquarters in Cleveland to increase office space . . . **G. Felsenthal & Sons, Inc.**, Chicago, has announced the sale of a "substantial amount" of capital stock in **J. L. Clark Manufacturing Co.**

Knox Glass Inc., Knox, Penna., has purchased the entire stock of **Buck Glass Co., Inc.**, Baltimore . . . **R. B. Denison Manufacturing Co.** has moved to expanded facilities in Bedford, Ohio . . . **St. Regis Paper Co.** will construct a kraft paper and paperboard machine at its Tacoma mill.



BATTLE CREEK'S NEW 51-CR WRAPS UP TO 130 FRACTIONAL PACKAGES PER MINUTE! A new high speed wrapping machine has been perfected to produce from 90 to 130 fractional packages per minute. Handles Cellophane (with or without polymer coatings); waxed glassine; or laminated foils. Converts quickly to the usual fractional package sizes, viz: square sodas, rectangular grahams, or rectangular sprayed crackers; in flat stacks. Can be equipped with pin type loaders. Forms a tightly contoured, snug overwrap that assures freshness and flavor retention. In spite of the high speed, the crackers are handled gently through all feeding and wrapping operations. **Battle Creek *"Continuous Flow"* Packaging Machines, Inc., Battle Creek, Michigan.**

Packaging dollars and cents:

For the fiscal year ended June 30, **Spencer Chemical Co.** reports sales of $57,584,334, compared with $45,148,936 for the previous fiscal year—a gain of nearly 28 per cent. Net income rose from $4,038,056 to $5,164,831 for the same periods. Increase is attributed to improved performance by all three product divisions—agricultural chemicals, industrial chemicals and plastics.

St. Regis Paper Co. shows net sales of $211,175,529 for first six months of 1959, compared with $178,874,289 for first half of 1958. Net income for first half of 1959 amounted to $13,422,471, compared with $8,069,009 for 1958's first six months . . . Net earnings of **The U. S. Printing & Lithograph Co.** were $902,240 for first six months of 1959, compared with $797,225 for corresponding period of 1958.

New sales and income records were set by **Interchemical Corp.** for first six months of 1959—sales, $62,134,000 (compared with $53,129,000 for first half of 1958) and net income, $3,352,000 ($1,836,000 for same 1958 period) . . . **Crown Zellerbach Corp.** reports first half of 1959 net income of $19,226,000 (an increase of 35 per cent from first half of 1958), and sales of $257,364,000 (15 per cent above 1958 sales for same period).

American Viscose Corp. announces first half 1959 earnings of $7,784,000, compared with $429,000 for same 1958 period. First six-months' sales show $126,710,000 for 1959 against $96,391,000 for 1958 . . . . Net sales for first six months of 1959 of $25,934,001 was reported by **National Starch and Chemical Corp.**, compared with $22,194,635 for corresponding 1958 period. Net income for same periods—for 1959, $1,550,764; for 1958, $1,350,723.

For first six months of 1959, **Federal Paper Board Co., Inc.** shows net income of $2,050,000 and sales of $35,302,000. For same period of 1958, net income was $2,013,000 and sales, $33,465,000 . . . . **Olin Mathieson Chemical Corp.** shows a 79 per cent increase in net profits for first six months of 1959 over same period, 1958—$17,504,000 for 1959; $9,801,000 for 1958. For same periods, 1959 sales amounted to $347,296,000, compared with $275,631,000 for 1958. Olin Mathieson attributes increase in net profits to higher sales and elimination of marginal and unprofitable facilities.

What people are doing:

Harry W. Fritts has been appointed manager of the packaging section of Aluminum Co. of America's sales development division . . . At Fibreboard Paper Products Corp.—**George W. Holt** will fill the newly-created position of

For more information circle No. 214 on Reader Service Card, Page 79

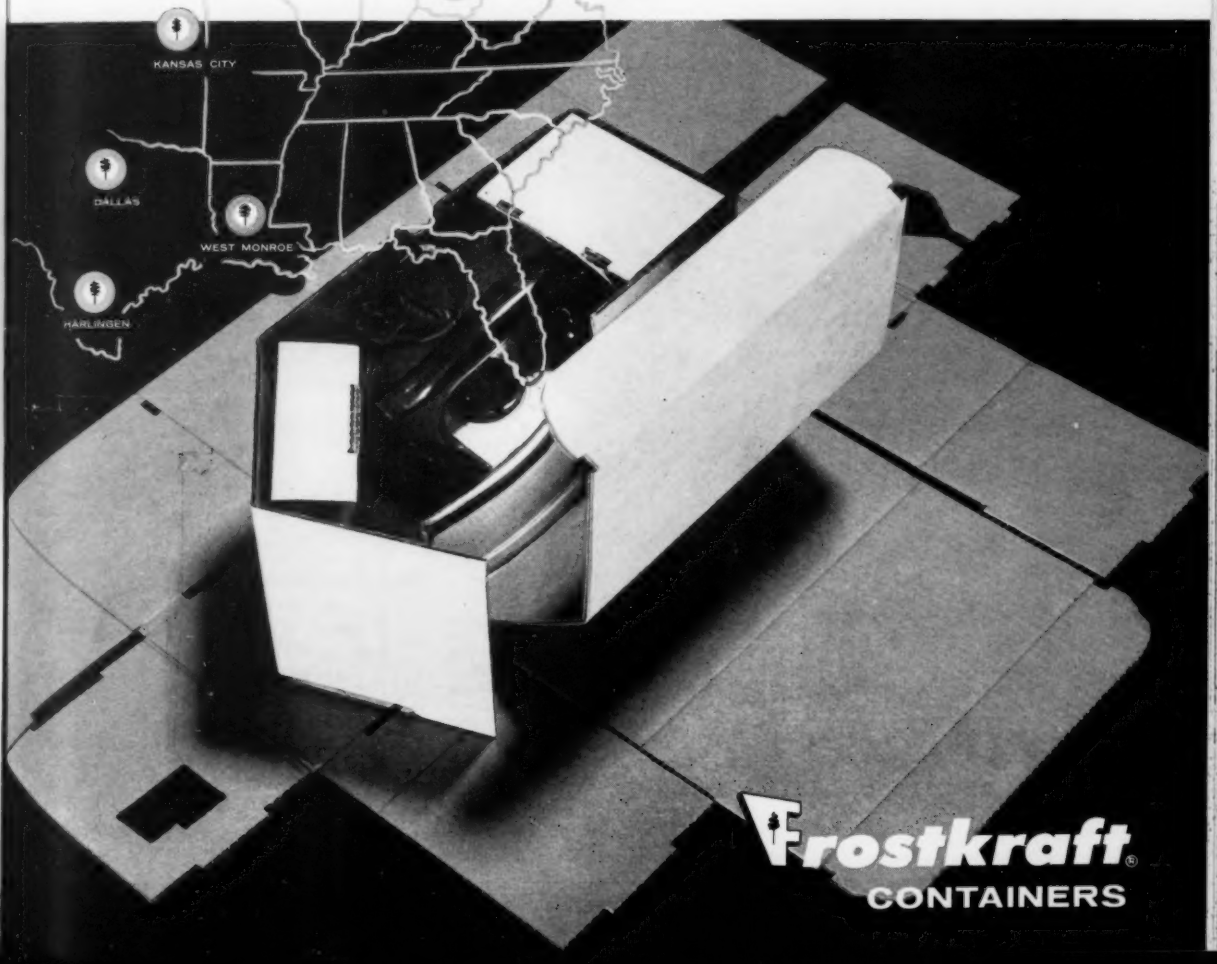
Circle No. 215 on Card, Page 79

from OLIN MATHIESON

Instant packaging service!

Olin Mathieson has seven container plants that can improve your packaging. Our package designers working in four creative design centers and three National Safe Transit labs can speed-up your packaging operations, reduce shipping losses, and help improve your position at the point of sale. Call our nearest plant today: West Monroe, Louisiana; Cincinnati, Ohio; Joliet, Illinois; Kansas City, Kansas; Owosso, Michigan; Dallas, Texas; Harlingen, Texas.

OLIN MATHIESON • PACKAGING DIVISION



manager of new product development, and **E. W. (Stace) Carey,** vice president-marketing, is now a member of the board of directors.

Director of new products planning for Visking Co., Union Carbide Div., is **George E. Bailie** . . . Promotions at Reynolds Metals Co.—**Garrett S. Nagle,** assistant vice president and manager of tobacco packaging market, now is tobacco market director; **Maurice F. Nagle,** assistant market manager, now market manager; **L. R. Payton,** manager of rigid container division, now executive assistant.

Roy C. Charron (Col., U. S. Army, ret.) has joined Stein Hall & Co., Inc. as adhesive specialist, technical division . . . **Dr. J. Alfred Hall** will retire August 31 as director of U. S. Forest Products Laboratory and will be succeeded by **Dr. Edward G. Locke,** chief of FPL's division of wood chemistry. Dr. Hall will do forest products consulting work in the Portland, Ore. area . . . The F. G. Findley Co. has named **Dr. William P. Utermohlen, Jr.** technical director.

The Dobeckmun Co., division of The Dow Chemical Co., has appointed **G. J. (Jack) Klusmire** product manager for Saran Wrap and Trycite films. On the West Coast, Dobeckmun has promoted **John D. Upp** to manager of market development, Berkeley; **D. H. Kerr** to northeast district sales manager; **Lloyd L. Partch** to sales representative, San Joaquin Valley . . . At The Dow Chemical Co., **R. J. Adam** is now manager of plastics sales, Buffalo; **Fred K. Quigley, Jr.** is staff manager of coating materials; **William A. Dunlap** is manager of plastics technical service activities in the South.

New sales representative for R. A. Jones & Co., Inc. is **William A. Rangnow** . . . **John S. Torrey,** general manager of Avery Label Co., has been elected vice president of Avery Adhesive Products, Inc. . . . A. H. Wirz, Ind. has named **G. Edmund Heine** its New York sales representative.

Corporate changes at Riegel Paper Corp. are: **A. P. Mitchell** will continue as senior vice president and assume the new position of director of marketing; **Charles E. Schaehrer** has been elected a vice president of the corporation and has been named sales manager of specialty products division (formerly the New Jersey Div.); at the Carolina Div., **Winthrop Endicott** is now sales manager of paper and paperboard . . . **Grant V. Hoyt** has joined Kartridg-Pak Machine Co., Mojonnier Associates Div., as service manager and assistant to general manager.

Management changes at Crown Zellerbach Corp.—Gaylord division has three new assistant vice presidents: **W. G. Hunt**—manufacturing and engineering, **Edwin J. Spiegel, Jr.**—administration, **M. M. Jamieson**—sales. At the Western-Waxide division, **M. A. Barr** was named divisional general manager, **R. L. Appling** assistant general manager-sales, and **E. A. Mitchell** assistant vice president for packaging . . . Former vice president of Container Laboratories, Inc., **Thomas P. Wharton,** is president of newly-formed Packaging Consultants Inc.

Extrudo-Film Corp. has named **V. Gregory Stanton** as sales representative, and **Joseph S. Persaud** has joined Extrudo as assistant sales manager, Midwest . . . **Joseph M. Hall** is the new manager of American Can Co.'s coil stock plant, Hammond, Ind. . . . **Laverne J. Butcher** has joined Crown Cork & Seal Co., Inc. as works manager of its Baltimore closure plant . . . Manager of silicone specialties division of Dow Corning Corp. is **Frederick R. Matthews.**

Frederick R. Barlow has joined Plastic Materials and Polymers, Inc. as director of sales and product development . . . **Allyn C. Beardsell,** former president of Container Laboratories, Inc., has been named director of The Mead Corp.'s new product development division . . . **Lawrence F. Reed** is manager of marketing appraisals, and **William A. Harnist** manager of market related economic studies in Owens-Illinois' newly created marketing development department.

Richard A. Knowlton is now representing Commercial Plastics & Supply Corp. in the northeast . . . Hoerner Boxes' new Tupelo, Miss. sheet plant will be headed by **Forrest R. Hamilton,** manager, **Carl Schmidt, Jr.,** plant superintendent and **Philip Cosgriff,** office manager . . . Sales manager for Plax Corp.'s Cincinnati district is **L. E. Gaines, Jr.,** and assistant district sales manager, Chicago, is **David L. Anderson.**

Sidney B. Lewis has been named assistant to executive vice president in charge of operations at St. Regis Paper Co. . . . Fome-Cor Corp.'s new technical director is **Frank S. Bonham** . . . At West Virginia Pulp and Paper Co.'s multiwall bag division, **John Floyd** is now technical service representative and **Willard G. Kleist,** sales representative, and at its Charleston mill, **Lunsford H. Lewis** has been named to the product development staff.

At American Viscose Corp., **N. Robert Herold** is now sales representative of film division in southern Illinois, and **J. J. Isom** is on sales staff, Dallas office . . . **Ambrose Y. Frantz,** plant manager of Turner Tube Corp., has been elected vice president . . . At Olin Mathieson Chemical Corp.'s packaging division, **Arthur T. Safford** is new divisional vice president for marketing, and **Leon Leslie** is southeastern carton sales representative. *(End)*

COMPACT...
VERSATILE...
ACCURATE...

Elgin
EARNS ITS WAY

SINGLE VALVE
FILLER

For Faultless Delivery of Products In Food . . . Paint . . . Cosmetic . . . Oil Industries

Highspeed, precision built machine designed to take less of your valuable floor space . . . assures you an accurate fill every time. Easily adapted to a broad range of liquid or viscous products and container sizes. Quickly and easily cleaned—perfect for light or heavy packs.

Write for complete literature.

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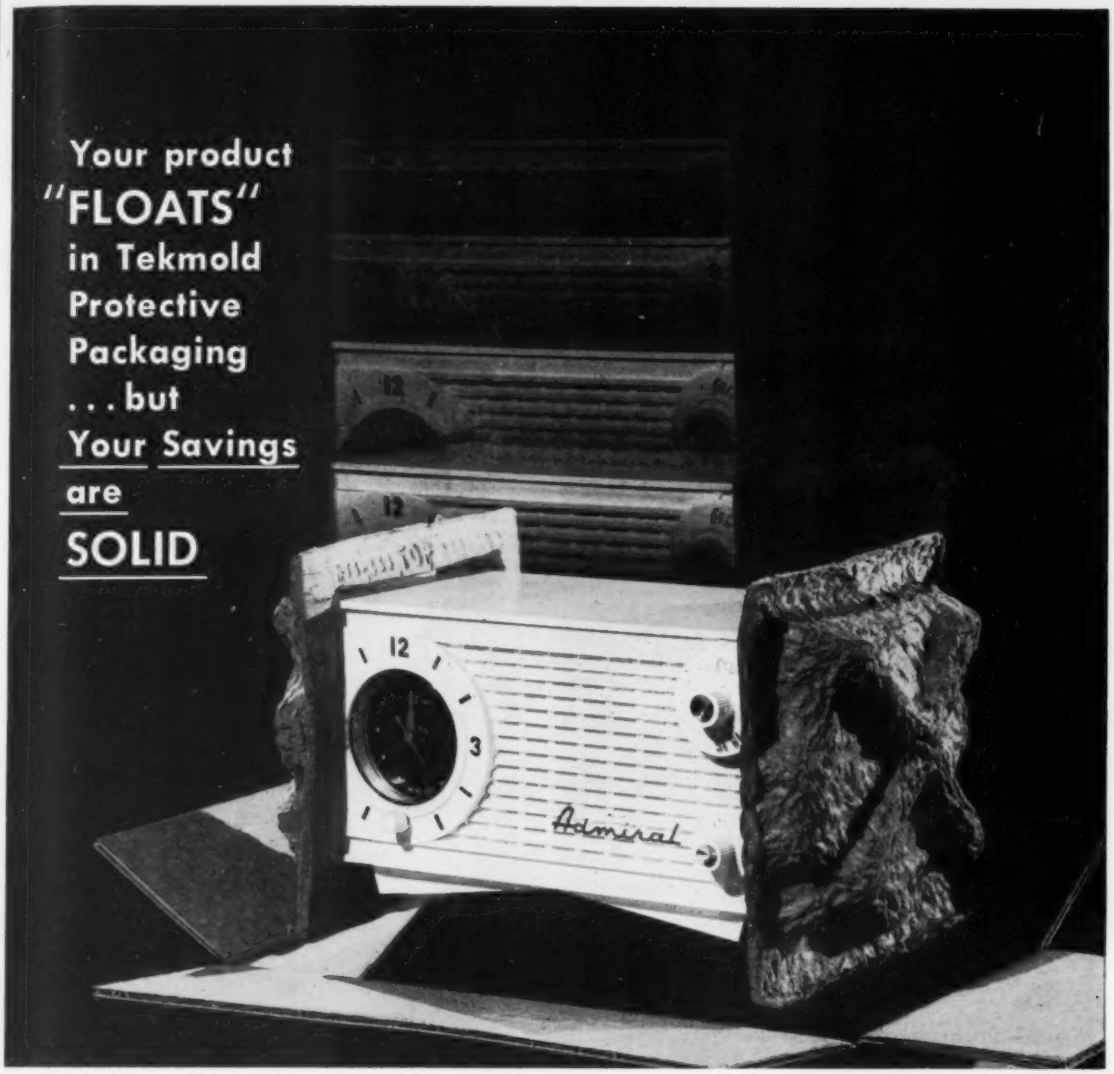
ELGIN MANUFACTURING COMPANY
200 Brook Street, Elgin 1, Illinois



Your appliances, fragile instruments or other easily marred or damaged products "float" safely in Tekmold Protective Packaging . . . cushioned in the custom-formulated, custom-molded forms.

But that is only half of the wonderful story.

There is an excellent chance you can save up to 40 percent on your internal packaging costs.

At right are three typical experiences, reported by two of the largest radio manufacturers in the country.

MANUFACTURER X . . .

Previously used 3 pieces of corrugated and wrap	15.3¢ per unit
Switched to Tekmold end caps and wrap	12.6¢ per unit
Package saving	**2.7¢ per unit**
Additional labor saving with Tekmold	3.0¢ per unit
Total saving	**5.7¢ per unit**

MANUFACTURER Y . . .

Previously used 4 pieces of corrugated and cabinet wrap	14.175¢ per unit
Switched to Tekmold end caps without wrap	10.6¢ per unit
Package saving*	**3.575¢ per unit**

MANUFACTURER Y . . .

Previously used 2 corrugated inserts and cabinet wrap	20.0¢ per unit
Switched to Tekmold end caps and wrap	10.6¢ per unit
Package saving*	**9.4¢ per unit**

*There were also labor savings, not detailed in the report.

Let's end this message with a verbatim quote from the packaging foreman of a large appliance manufacturing company that switched to Tekmold Protective Packaging:

"*Boy, I hope I never see a corrugated fold-up again!*"

For the *complete* Tekmold story, write or phone us today.

TEKMOLD PRODUCTS PLANT
Bemis Bro. Bag Co.
325 27th Ave., N. E., Minneapolis 18, Minn.

BEMIS

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DISCOVERY OPENS NEW ERA FOR PAPER

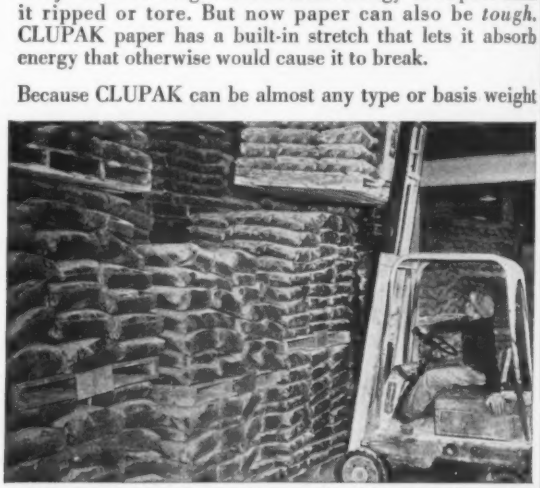
NOW, PAPER THAT S

DROPPED CAN crashes through ordinary paper which lacks stretch, but bounces off CLUPAK paper of equal basis weight. Unlike creped paper which stretches easily, every fiber of CLUPAK paper resists as it stretches.

NEW TOUGHNESS, FLEXIBILITY CUTS PACKAGING COSTS, INSPIRES NEW PRODUCTS.

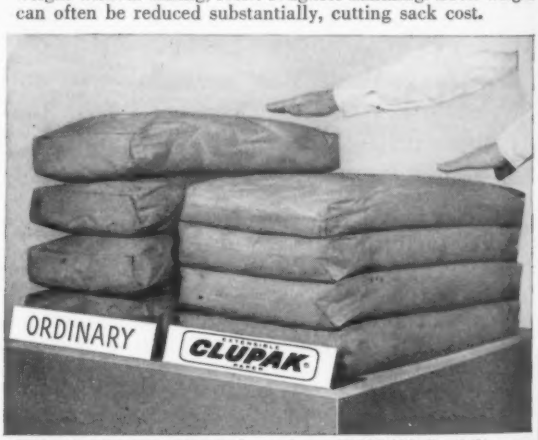
Until the invention of CLUPAK Extensible Paper, paper has just been strong. It resisted the energy of impact until it ripped or tore. But now paper can also be *tough*. CLUPAK paper has a built-in stretch that lets it absorb energy that otherwise would cause it to break.

Because CLUPAK can be almost any type or basis weight

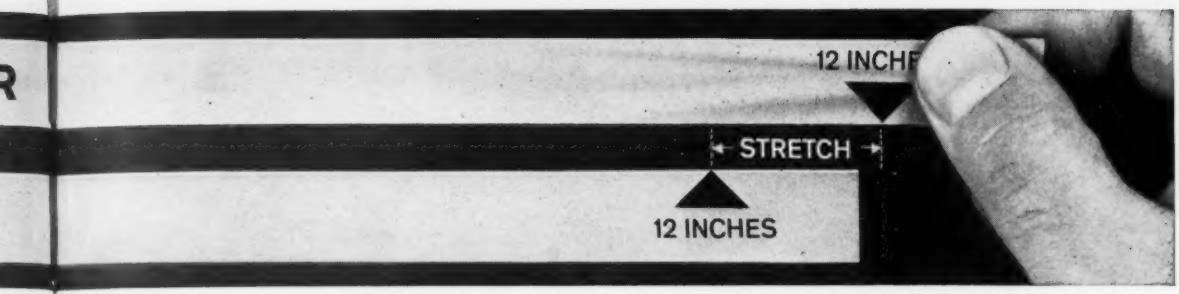


MULTIWALL SACKS perform strikingly better when made with CLUPAK paper. Bottom sacks here carry 6,000 pound weight without failing, resist roughest handling. Basis weight can often be reduced substantially, cutting sack cost.

GROCERY BAG of ordinary kraft splits, spills contents after drop, but the much tougher CLUPAK paper bag absorbs shock, remains intact.



STACK COMPARISON shows how CLUPAK flexibility enables multiwall sacks to fill better, for many products, saving up to 25% of space needed for storage and shipping.



...STRETCHES

of paper, with varying controllable degrees of stretch, it transforms conventional paper into virtually a new material—one with almost unlimited possibilities.

CLUPAK stretch is already giving multiwall sacks, grocery bags, magazine wrappers, paper-base pipe and laminates, shipping containers and many other products spectacularly better performance and lower costs. And the flexibility of CLUPAK papers can also mean startling savings and advantages in many uses and situations.

But these applications of CLUPAK Extensible Paper are only the beginning. CLUPAK is the most exciting new word in paper. The "give" it adds to paper opens a new era, invites a thousand new products and design improvements. We suggest you investigate the potential of CLUPAK for your business. It will pay you to consult your paper supplier. Our licensees, who make CLUPAK paper, are listed below. ***Clupak, Inc., 530 Fifth Avenue, New York 36, N. Y.***

UNIQUE TEST machine measures and graphs far greater toughness of CLUPAK paper. Printability, surface friction, porosity and other properties of CLUPAK paper can be controlled as with conventional paper.

KEY FACTS FOR BUYERS

1. CLUPAK kraft is the same as ordinary kraft except that it is stronger, tougher and more flexible. Its built-in stretch accommodates strains that break ordinary kraft.
2. This increased toughness, for example, allows multiwall sack users to increase strength yet decrease the number of plies with resulting economies.
3. CLUPAK, INC. conducts research and development activities and advises licensees on technical matters.
4. CLUPAK, INC. permits the use of its trademark EXTENSIBLE CLUPAK PAPER only on paper which meets this company's rigid toughness requirements.

TRADEMARK "CLUPAK" is your assurance that paper will deliver remarkable CLUPAK benefits. Look for it, expect it.

BE SURE TO LOOK FOR THIS TRADEMARK

EXTENSIBLE **CLUPAK®** PAPER *

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority.*

You can now get CLUPAK paper and products made with CLUPAK paper from

ALBEMARLE PAPER MANUFACTURING CO.
CALCASIEU PAPER CO.
CANADA PAPER CO. *(Canada)*
CROWN ZELLERBACH CORP.
CONTINENTAL CAN COMPANY, INC.
DYNÄS AKTIEBOLAG *(Sweden)*
HUDSON PULP AND PAPER CORP.
INTERNATIONAL PAPER CO.
ST. LAWRENCE CORP., LTD. *(Canada)*
ST. REGIS PAPER CO.
UNION BAG-CAMP PAPER CORP.
WEST VIRGINIA PULP AND PAPER CO.

LABORATORY REPORT

Hygroscopic Packaging

Project 1201-A

NEW INSTANT APPLE SAUCE PACKAGE RESISTS MOISTURE, RETAINS VITAMINS

Vacu-dry Company, Oakland, California asked for help in developing a package for highly hygroscopic new product--instant apple sauce. Primary plans were to market through institutional channels. Vacu-dry considered cans but preferred the lower weight, lower cost, and convenience of Crown Poly Moistite bags. Vacu-dry extensively tested these bags and asked that similar tests be conducted at Western-Waxide's Product and Research Laboratory. Primary objective: to be sure protection was not being sacrificed to gain these other advantages.

TEST RESULTS: (High-Humidity storage--100°F 90% R.H.)

Moisture Gain: ½ of 1% - Excellent Granularity: Excellent

Vitamin Retention: Excellent

USE FEATURES: Easy opening--bag may be reclosed tightly to keep unused contents dry. Instructions and product information printed right on bag.

COST FACTORS

Material 48 % less than cans Weight 10 % less than cans

Space 23 % less than cans Packaging semi-automatic

#1201 - A

Product: Instant Apple Sauce

Producer: Vacu-dry Company, Oakland, California

Construction: Moistite Construction 2 PE-4

Printing: Flexographic Red, Green, Yellow

Dimensions: 7 lbs. (Equivalent to 1 case #10 cans wet product) 6 x 3¾ x 15¼

19 ozs. (Equivalent to a #10 can wet product) 3¾ x 2¼ x 9

Can you use packaging assistance like this? It's yours for the asking. Just write to Hygroscopic Packaging, 2101 Williams St. San Leandro, California.

CROWN ZELLERBACH
WESTERN-WAXIDE DIVISION

Code wrappers
for current production only

With a Tickometer, you can code wrappers, labels or small packages with date, formula, lot number, etc., by imprinting them as needed for current output.

Tickometer coding is far faster than hand stamping; cheaper than pre-printed coding; and avoids the waste of unuseable pre-coded materials.

- A Tickometer can be used to imprint codes, quantity, weight, color, price, specifications —from 400 to 1,000 items a minute. In many companies, the packaging required for the next day is imprinted in a few minutes in the afternoon.
- It handles most weights and surfaces of paper and light board, in sizes from 1 by 2 up to 15 by 15 inches. Automatically feeds and stacks, is easy to set up and use.
- The Tickometer is also a rapid and accurate counting machine for forms, coupons, tags, tickets, sales slips, etc.—counts eight times as fast as an experienced worker can count by hand. *It's so accurate that banks even use it to count currency.* It will register partial and total amounts; can be set for predetermined count. With accessories, it can sign or endorse checks, or do consecutive numbering.
- The Tickometer can be bought or rented. Pitney-Bowes service is available from 302 points. Ask the nearest Pitney-Bowes office for a demonstration. Or send coupon for free illustrated booklet and case studies.

Pitney-Bowes

TICKOMETER

Imprinting & Counting Machine

Made by the originator of the postage meter . . . offices in 121 cities in U.S. and Canada.

PITNEY-BOWES, INC.
7729 Walnut Street
Stamford, Conn.

Send Tickometer booklet and case studies.

*Name*_____

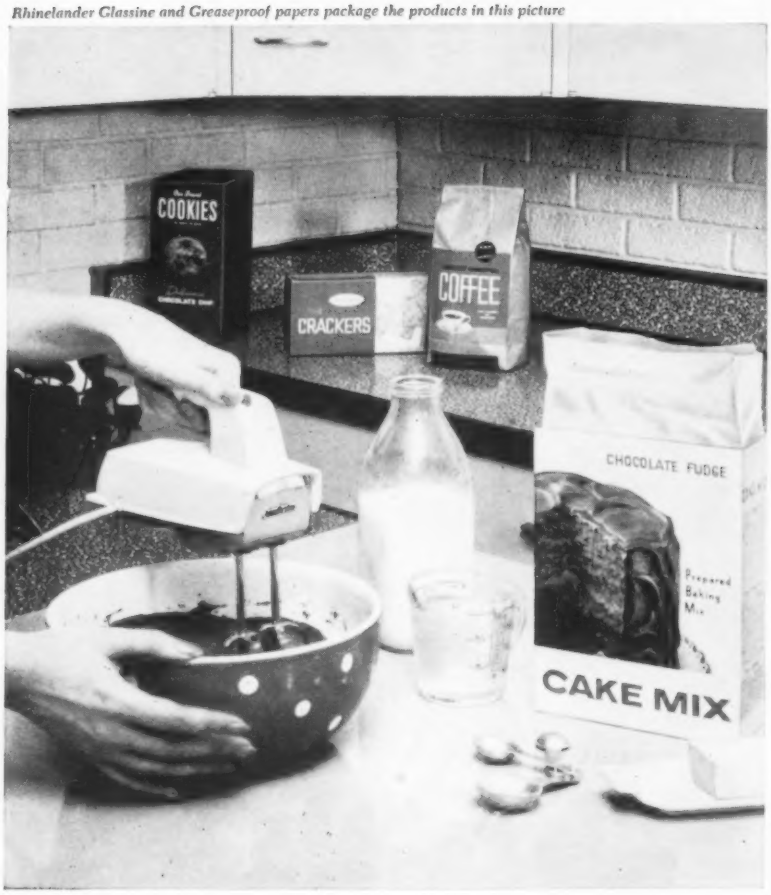
*Address*_____

For more information circle No. 220 on Reader Service Card, Page 79

Circle No. 219 on Card, Page 79

beat well... goes for paper making, too

Rhinelander Glassine and Greaseproof papers package the products in this picture



Beat Well says the recipe – and the housewife who knows her cakes knows the importance of beating. And beating is equally important in the making of the high density wax laminated liners that protect cake mixes. These and a host of other time-saver foods are packaged in Glassine and Greaseproof papers . . . the wonder papers of modern packaging. Write for complete information stating your particular application.

In making Glassine and Greaseproof at Rhinelander, beating is a meticulously controlled process, considerably lengthened to transform the cellulose fibres into tiny strands, later tightly compacted on the paper machine. The microscopic fibrillae give Glassine and Greaseproof its density, its greaseproofness, and versatility.

These tight, dense papers keep foods fresh – resist greases, oils and fats—retain aromas, and protect flavor and quality.

RHINELANDER

Rhinelander Paper Company • Rhinelander, Wisconsin

Division of St. Regis Paper Company

GLASSINE AND GREASEPROOF... *PAPERS FOR PROTECTIVE PACKAGING*

For more information circle No. 221 on Reader Service Card, Page 79

Packaging Formula Not Found in Books Solves "Problem" Products' Shipment, Storage, Display

$$\sqrt{\frac{KC}{YPP + x^n + x^n}} \ *$$

We love tough packaging problems — and for over 40 years have been successfully solving them! And with "Canvelope" we believe we can lick your toughest assignment. It is an ideal container for products having extreme fineness, high specific gravity and/or sensitivity to moisture change, i.e., powders, cake mixes, drugs, etc.

What makes us so confident? Nothing but our own experience and users' glowing tributes to "Canvelope" — and for good reasons . . .

It's as tough as a tin can, yet flexible as a bag. It's air-tight and leak-proof — will not allow moisture to creep in nor its contents to seep out. It is ideally suited to packaging materials where change of atmosphere or chemical nature generally cause short life or spoilage. Its inert plastic coated aluminum lining assures complete safety against such hazards.

Furthermore, it packs and travels easily; and its exterior surface is ideal for imprinting your own sales-stimulating design. In a word, "Canvelope" *is* the word. Why not look into it today by filling in and mailing the coupon below. We'll send you the confidential facts and samples r-u-s-h! Fair enough?

* Solution to the above formula is this: Kehr "Canvelope" over your Packaging Problem plus unknown factors of infinite variety, plus more of the same, equals the square root of just what you are looking for.

NEW MOISTURE PROOF **CLEARVELOPE**

Does More! Costs Less!

Moisture can't get in . . . the product can't get out! The Kehr "Clearvelope" bag is completely seamless front, back and bottom . . . a unique moisture-proof and sift-proof construction that lends itself to automatic, semi-automatic and hand filling operations with minimum handling costs.

Available in cellophane, aluminum foil, acetate, laminated and coated glassine and laminated paper.

MAIL IT TODAY FOR CONFIDENTIAL INFORMATION

Kehr PRODUCTS COMPANY

419 N. Broad Street, Phila. 8, Pa. • WAlnut 5-3356

Designers and Manufacturers of: **Bags, Pouches, Tubing, Canvelopes, Sheets and Rolls from Flexible Films, Foils, and Papers printed by the Flexographic or Rotogravure Processes.**

KEHR PRODUCTS COMPANY PE 9-59
419 N. Broad Street, Philadelphia 8, Pa.

Please rush me the confidential facts, figures and sample of
Canvelope ☐ Clearvelope ☐

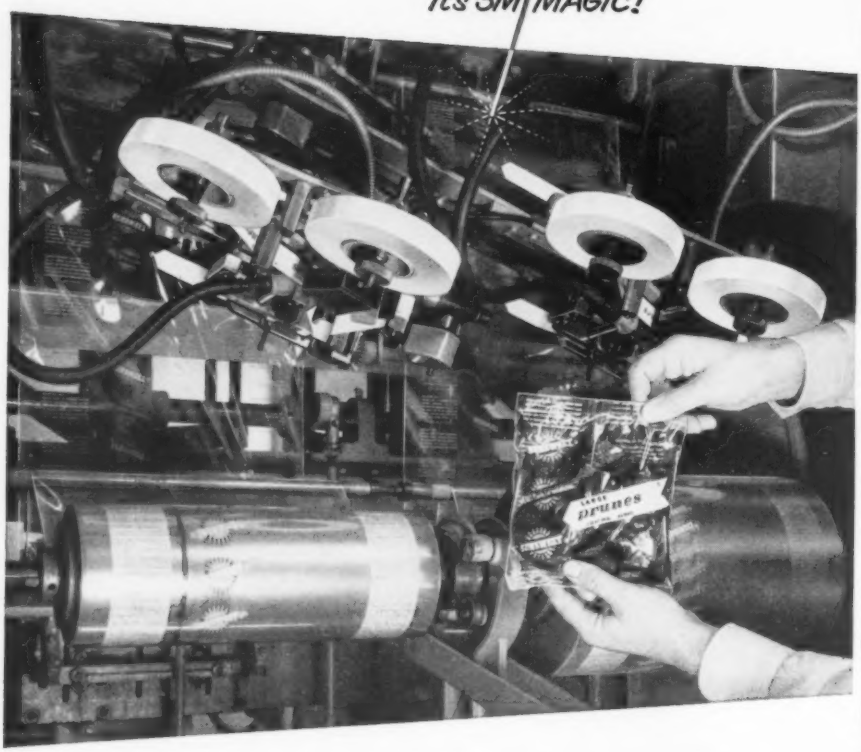
My Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

It's 3M MAGIC!



TAPEnology streamlines bag inventories with high-speed custom labeling!

Now California's Sunsweet Growers use *one* basic pre-printed film as bag stock for a wide variety of packaged fruits. Printed "SCOTCH" Brand Cellophane Tape lets them change a pack label just by changing the tape rolls.

Basic film stock is pre-printed with brand name and slogan only; bags are individualized for each specific product with form-cut strips of the tape printed *on the adhesive side* and applied to the inside surface of the film stock. Entire operation is automatic at high speed using a custom-built applicator designed with the help of a local tape printer-converter and 3M's Customer Engineering Service.

What do you pack? Chances are, the ingenuity and technical resourcefulness used in this Sunsweet operation can also help you find a better way to package—at higher speeds and with lowered costs. Ask your regular "SCOTCH" Brand Tape Distributor, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. IAK-99.

When tape costs so little, why take less than "SCOTCH" Brand?

SCOTCH BRAND
SCOTCH BRAND
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SCOTCH BRAND
SCOTCH BRAND
SCOTCH® BRAND
SCOTCH BRAND

"SCOTCH" is a registered trademark for the pressure-sensitive adhesive tapes of 3M Co., St. Paul 6, Minn. Export: 99 Park Ave., New York 16. Canada: London, Ontario.

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

For more information circle No. 223 on Reader Service Card, Page 79

Circle No. 224 on Card, Page 79

NEW DESIGNS IN MARLEX

New PLAX bottle for Breck Children Shampoo is made of rigid, unbreakable MARLEX*

New Breck Children Shampoo is made especially for the fine, delicate hair of children . . . does not sting the eyes, according to the Breck Research and Development Laboratories.

For its new Children Shampoo, John H. Breck, Inc. wanted a new package that was attractive, lightweight, unbreakable, compatible with the product and suitable for machine filling. So working with PLAX Corporation, Hartford, Conn., they designed a beautiful, unbreakable bottle, blow-molded from MARLEX rigid polyethylene that met every specification required.

By using MARLEX 5000 Series resin, tailor-made for detergents, PLAX obtains maximum strength, rigidity and resistance to stress-cracking, with minimum weight and wall thickness. Lightweight containers made of MARLEX also save Breck thousands of dollars on shipping costs and breakage losses!

No other type of material serves so well and so economically in so many different applications. How can MARLEX serve you?

*MARLEX is a trademark for Phillips family of olefin polymers.

PHILLIPS CHEMICAL COMPANY, Bartlesville, Oklahoma

A subsidiary of Phillips Petroleum Company

PLASTICS DIVISION OFFICES

NEW ENGLAND	NEW YORK	AKRON	CHICAGO	WESTERN	SOUTHERN	EXPORT
322 Waterman Avenue East Providence 14, R.I. GEneva 4-7600	80 Broadway, Suite 4300 New York 5, N. Y. Digby 4-3480	318 Water Street Akron 8, Ohio FRanklin 6-4126	111 S. York Street Elmhurst, Ill. TErrace 4-6600	317 N. Lake Ave. Pasadena, Calif. MUrray 1-6997	6010 Sherry Lane Dallas 25, Texas EMerson 8-1358	80 Broadway, Suite 4300, New York 5, N.Y. Digby 4-3480

MARLEX®
Phillips 66
* PHILLIPS 66 PLASTIC

To give the housewife "instant" Mashed Potatoes with all the natural flavor goodness of "home" cooking, R. T. French pack their dehydrated product in "STAY-FRESH" pouches made from a Thilco grade that combines bleached white super-calendered Pouch paper with foil and Polyethylene.

To preserve the true richness and flavor of powdered chocolate and to prevent its "caking" over indefinite shelf-life periods, Servit Foods Co. package their product in heat sealable pouches made from a special Thilco Poly-coated, super-calendered grade. It is furnished flexo-printed in a two-color combination.

Favorite packaged food with housewives everywhere is Kitchen Arts' complete line of Py-O-My Pie, Cake and Muffin Mixes. Basic ingredients are pouch-packaged in papers by Thilco that combine the finest quality super-calendered, pouch grade with polyethylene. Sales message is furnished Print Decorated by Thilco.

Thilco's ingenious paper combinations for keeping foods "FACTORY FRESH" offer radically new marketing solutions

The delicious flavors of E-Z Jell dessert powders are preserved for freshness and prevention of "caking" by a special Thilco multi-grade package liner that combines wax coatings with heavy wax laminated bleached krafts. It folds and seals excellently on automatic machines without cracking, flaking or M.V.T. loss.

From dog chow to breakfast cereals, Purina products go to market safeguarded for factory freshness, flavor and crispness in Thilco's amber-waxed carton liner R-32 — one of the lowest M.V.T. waxed paper grades in the packaging field. It also features unusually high tear strength — excellent heat sealability.

The types of food packaging papers Thilco can furnish are unlimited, indeed! Our complete integrated mill facilities make it possible for us to supply protective grades in endless combinations of glassines, greaseproofs, waxed thermoplastics, foils, cellophane, polyethylene and others, as well as bulk packaging papers and heavy duty shipping wraps to fulfill your most exacting needs. Remember, too, Thilco papers can be furnished PRINT-DECORATED for identification and advertising value.

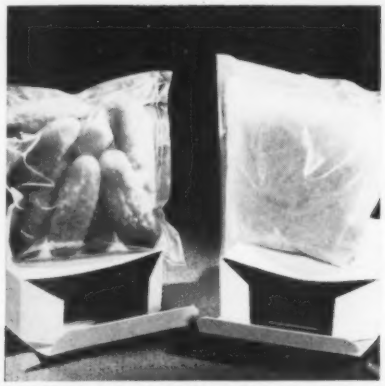
Write for more information and Thilco's Free Sample Kits

Tell us your packaging problem and the protective objective you wish to attain. Chances are we've a packaging grade to fill the bill — but if not, we'll make one to your specifications.

THILCO
Functional Papers
THILMANY PULP & PAPER COMPANY
KAUKAUNA • WISCONSIN

NEW YORK • CHICAGO • DETROIT • BOSTON
CLEVELAND • CINCINNATI • CHARLOTTE

FROZEN FOODS are attractively packaged in envelopes of "Scotchpak". Delicate seasoning is preserved during preparation—since food can be boiled in bag.



PICKLES, SAUERKRAUT and other foods packaged in a brine or broth are pasteurized, packaged, and displayed in compact, lightweight envelopes of "Scotchpak".

VACUUM-PACKED foods stay vacuum-packed in "Scotchpak"! Film has low permeability to air, other gasses and water vapor. Cuts packaging and shipping costs.

"SCOTCHPAK" TAKES OVER

and streamlines a multitude of packaging jobs!

Looking for a film that's *tough*, clear as glass—one you can freeze or boil? And would you like that same film to be heat-sealable with a seal that's as tough as the film itself? Then your answer is "Scotchpak."

Here is a film that combines the best features of many films. It can be heat-sealed in less than 2 seconds—a temperature of 300° to 400° F. and 20-60 psi is all that's required.

"Scotchpak" Film resists freezing cold (down to -70°F.) and boiling heat (up to 240°F.). It resists acids, oils, alkalies and organic solvents. It is light (saves shipping costs!) and compact (saves space in shipping and on the shelf, too!)

"Scotchpak" is now available in roll-stock widths up to 50 inches—from 2 mils to 4.5 mils thick, ready for printing—if you desire. It can be easily handled on conventional bag-making and filling equipment.

Our Customer Service organization is ready to work with you to show you how "Scotchpak" can solve your film fabrication and packaging problems. For complete information, write Film Products Group, Dept. CAS-99, 3M Company, St. Paul 6, Minnesota.

SCOTCHPAK BRAND

SCOTCHPAK BRAND

SCOTCHPAK BRAND

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SCOTCHPAK BRAND

SCOTCHPAK® BRAND HEAT-SEALABLE POLYESTER FILM

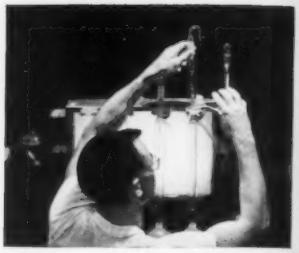
SCOTCHPAK BRAND

"SCOTCHPAK" IS A REGISTERED TRADEMARK FOR THE HEAT-SEALABLE POLYESTER FILM OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY



At Eastman

QUALITY CONTROL

is a company's conscience "at work"

Tenite is more than a trade name for Eastman's plastics ...it's a pledge of promised performance

You can measure a company's conscience by the care taken to uphold the quality of its products.

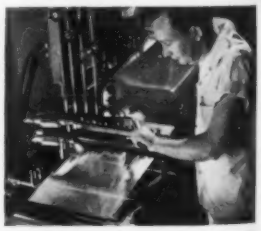
If those products are plastics, uncompromised control is a "must"...for plastics are unique materials. Perhaps no other class of raw materials used by the manufacturing industries has so many variable—yet controllable—physical properties. Flow or moldability, stiffness, heat resistance, weather durability, color, light transmission, hardness...are just a few of the properties that can be custom tailored to meet the needs of a specific application or a specific fabricating procedure. Such flexibility in setting the physical properties of a raw material is an advantage which must be protected by accurate control. For once an acceptable formulation has been created and sold to satisfy both performance and production demands, it is necessary to maintain those properties within extremely narrow limits to assure trouble-free molding operations as well as satisfactory service.

At Eastman, Tenite Quality Control is the vigilant watchdog over the production of all Tenite plastics. This group has the continuing responsibility to conduct all necessary testing to forestall deviation from the specifications set for the many formulations.

So varied and so complete is the testing done by Tenite Quality Control, that this one control section of Eastman requires a staff of over 100 trained personnel.

Acting as a nerve center, sensitive to any factor that could swing a formulation away from its prescribed limits, Quality Control approves or rejects the results in all phases of the production of every pound of Tenite plastic made.

Control of quality begins with approval of the basic raw materials. Even though most of the basic materials that go into Tenite plastics are supplied by other members of the Eastman industrial family, Tenite Quality Control has the final voice in the acceptance or rejection of these materials. At Kingsport, Tennessee, where Butyrate, Acetate and Propionate are made, raw materials such as cellulose esters, plasticizers, colorants and other additives are rigorously tested and graded on their suitability for compounding into clear transparent plastic or into transparent, translucent or opaque colored plastics. Indicative of the care taken to assure shipments of Tenite plastics that are right for each use, is the fact that no order for Tenite Butyrate, Tenite Acetate or Tenite Propionate is filled "out of stock." *Every*



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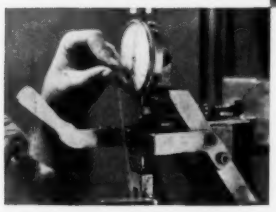


order for these three plastics is made to order as a separate batch, custom-produced to meet the exact specifications requested.

At Longview, Texas, where Tenite Polyethylene in both low- and medium-density grades is produced via continuous processing, Quality Control maintains a constant check of the purity of the ethylene gas as it enters the reactors.

During production of both cellulosic and polyethylene plastics, various tests are conducted at intermediate stages to insure proper control of the chemical reaction. Similarly, after production, samples of the plastics are carefully molded by Quality Control to be sure their forming characteristics are suited to the customer's fabricating equipment. In addition, flow, color, along with physical and chemical stability are also checked. If any special qualities, such as fire retardance or resistance to ultra-violet have been specified, Quality Control runs extra tests on the plastic before shipment to confirm that these requirements have been met.

Color gets particular attention. Over the years, Tenite plastics have won an enviable reputation for accurate color matches. To date, plastics in more than 40,000 different colors and color effects have been produced by Eastman.

Finally, after Quality Control has been satisfied that the Tenite plastic will fully meet all specifications of the customer's order, it is approved for shipment. Even after shipment, Quality Control remains in the picture. Physical samples of all plastics shipped are kept for six months. In addition, all records on the processing of these shipments are retained for five years. Result: Quality Control has a continuing guide for filling subsequent orders with duplications of the original plastic.

Ever since Eastman began producing plastics in 1932, an alert awareness has existed that users of plastics have a critical need for material that is consistent in its performance and handling properties shipment after shipment. If one word were to be singled out to describe the outstanding virtue of Tenite plastics, it would have to be chosen from such adjectives as *uniform, consistent, unvarying, dependable.* But whatever the word, the end-result has been satisfaction for our customers... *and for us.*

And, after all, that's the purpose of having a conscience.

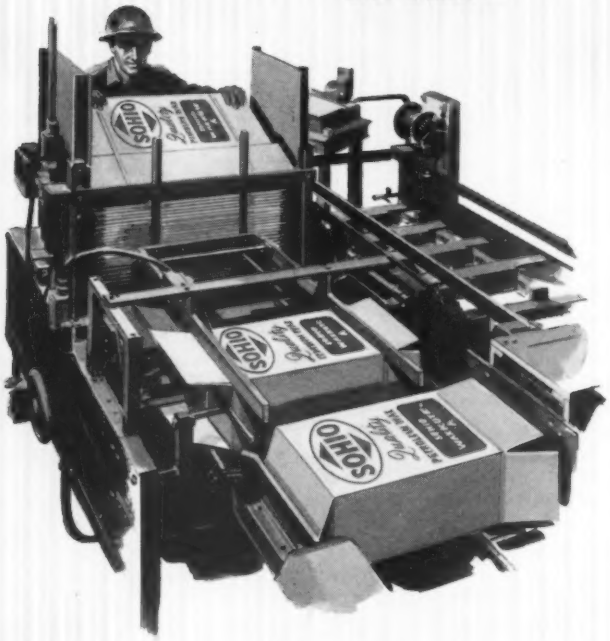
The full story of the detailed testing that underwrites the reputation of Eastman plastics, is told in a 20-page booklet, "QUALITY CONTROL." For your free copy or more information on Tenite plastics, write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

TENITE®

BUTYRATE · POLYETHYLENE · PROPIONATE · ACETATE

Dependable plastics by Eastman

These boxes do everything but balk...

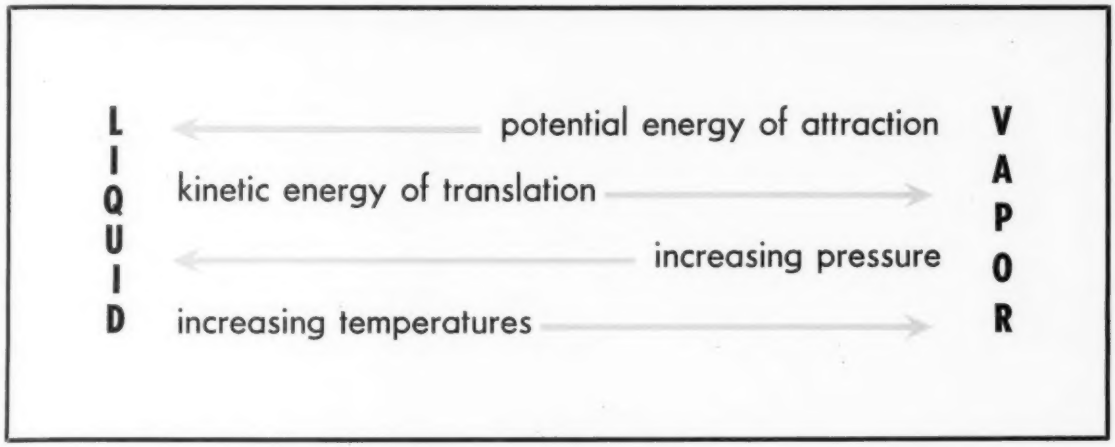


H & D corrugated boxes for shipping Sohio wax start through this machine knocked down. They're set up, packed and sealed—automatically. Would precision packaging speed up your operations? Better see H & D.

Hinde & Dauch

Division, West Virginia Pulp and Paper

AUTHORITY ON CORRUGATED PACKAGING • SANDUSKY, OHIO
15 FACTORIES • 42 SALES OFFICES



1. **FORCES AND THE DIRECTION OF EACH** which act to change the state of a liquid and its vapor.

Moisture versus dry foods: Key to effective packaging

By Milton Kaplow,
Project Leader, Packaging Laboratory,
Research Center,
General Foods Corporation,
Tarrytown, New York

Many dry foods tend to absorb moisture from the atmosphere, and become sticky and caked, or soggy, depending on the particular product. One of the functions of packaging is to protect these products against the moisture in the atmosphere.

In order to understand the conditions which cause moisture absorption, and how packaging can prevent this absorption, it is necessary to understand the basic principles that relate to vapor pressure, relative humidity, and water vapor transmission.

VAPOR PRESSURE

In packaging, we are concerned with moisture in the product and water vapor (moisture) in the air. Moisture in the product can usually be considered as liquid water while moisture in the air is gaseous. **It is important to know the factors that determine whether the water is in the liquid or gaseous state.** A diagram showing the forces that affect liquid water and water vapor is shown in Fig. 1.

Potential And Kinetic Energy

The potential energy of attraction is the force between molecules that holds them together, and this force tends to form liquid water. The kinetic energy of translation is the force with which the molecules move, and this force tends to sep-

Making effective use of economic, functional packaging protection often depends on having an adequate understanding of the physical chemistry of solution. For example, when a dry food picks up enough moisture to become unsalable, the chief thing that has happened is that it has a saturated solution of one of the ingredients as a coating on the food particles. Mr. Kaplow's discussion of this and related problems offers a key to understanding the theories and principles involved. He explains why moisture pickup by a dry product is mainly dependent on relative humidity, and that vapor pressure and temperature have only a relatively small effect.

TABLE I

How Temperature Change Affects Equilibrium Vapor Pressure And Relative Humidity

Temp. (°F.)	Partial Pressure	Equil.V.P. (in. of Hg)	R.H. (%)	Climate
60.....	0.4696	0.5218	90.0	Humid
100.....	0.4696	1.9325	24.3	Dry

TABLE II

A Few Typical Salts That Are Used In Saturated Solutions To Control Relative Humidity For Small Tests In Packaging

Saturated Salt Solution	35°F.		73°F.		90°F.		100°F.	
	R.H. (%)	V.P. (in. Hg)	R.H. (%)	V.P. (in. Hg)	R.H. (%)	V.P. (in. Hg)	R.H. (%)	V.P. (in. Hg)
LiCl	11.2	0.022	11.1	0.089	--	--	11.1	0.203
$MgCl_2$	35.0	0.071	32.9	0.266	32.2	0.445	31.9	0.590
$Na_2Cr_2O_7$	58.0	0.118	54.1	0.440	51.3	0.727	50.0	0.957
NaCl	75.0	0.154	75.5	0.614	75.2	1.068	75.1	1.431
K_2CrO_4	88.0	0.178	86.5	0.707	86.0	1.211	85.6	1.655
$(NH_4)_2HPO_4$	94.0	0.193	93.9	0.757	--	--	91.1	1.769

TABLE III

Storage Tests Of Jell-O At Four Relative Humidities To Show The Amount Of Moisture Pickup Under These Conditions

Sample No.	Solution	Temp. (°F.)	R.H. (%)	Equil. V.P. (in. of Hg)	Condition of Jell-O
1	LiCl	35	11.2	0.022	Dry
2	LiCl	100	11.1	0.203	Dry
3	K_2CrO_4	35	88.0	0.178	Wet
4	Water	35	100.0	0.204	Wet

arate molecules from each other, thereby favoring the vapor state.

An increase in pressure forces the molecules together, allowing the potential energy of attraction to pull the molecules together into the liquid state. The kinetic energy of translation increases with increasing temperature, thus an increase in temperature causes movement of water molecules into the vapor state.

Evaporation And Condensation

In any liquid having a surface exposed to the atmosphere, there are some highly energized molecules that escape into the atmosphere when they reach the surface of the liquid. **This escaping action is called vaporization or evaporation.** These vaporized molecules strike the sides of the container as they move about in the atmosphere, and the pressure caused by these molecular blows is known as the *partial pressure* of the vapor.

When the water molecules in the gaseous state strike the surface of the liquid, they are affected by the potential energy of attraction, and they are pulled back into the liquid state. **This process is called condensation.**

Dynamic equilibrium exists. When the rate of condensation equals the rate of evaporation, a dynamic equilibrium exists, and the vapor pressure of the water vapor at equilibrium is the equilibrium vapor pressure of the liquid. The equilibrium vapor pressure of each liquid is different depending on its nature.

Clausius-Clapeyron Equation

Since the kinetic energy of translation is directly proportional to absolute temperature, a higher temperature results in a higher rate of evaporation, and a higher equilibrium vapor pressure. Calculation of the fact that the equilibrium vapor pressure of water increases with increasing temperature can be made with the Clapeyron equation or the Clausius-Clapeyron equation:

$$\frac{dp}{p} = \frac{\lambda dT}{RT^2}$$

where R = gas law constant (1.99 cal./gm. mol./deg. K.), λ = molal heat of vaporization.

When the temperature of a liquid is raised to the point where the equilibrium vapor pressure equals the atmospheric pressure, boiling occurs, and the liquid goes completely into the vapor state. Boiling also will occur at a lower temperature if the external pressure is lowered.

RELATIVE HUMIDITY

When the partial pressure of the vapor equals the equilibrium vapor pressure of the liquid, the atmosphere is saturated with the vapor. If the partial pressure is less than the equilibrium vapor pressure, the proportion between them can be expressed as relative saturation or per cent of saturation. When our concern is with water and water vapor, the per cent of saturation is referred to as *relative humidity.*

Effects Of Temperature Change

Since temperature changes affect the equilibrium vapor pres-

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sure, **they also affect the relative humidity.** This relationship is demonstrated by the data in Table I. If we have a situation of 60° F. and a partial pressure at 0.4696 in. of mercury, the relative humidity is 90.0 per cent, because the equilibrium vapor pressure at 60° F. is 0.5218 in. If the partial pressure remains constant and the temperature is raised to 100° F., the relative humidity drops to 24.3 per cent because the equilibrium vapor pressure at this higher temperature is 1.9325 in. of mercury.

VAPOR PRESSURE OF SOLUTIONS

In packaging of dry foods the absorption of a relatively small amount of water causes the product to be unsalable. Therefore, we are usually concerned with saturated solutions on the surface of food particles caused by the relatively large amount of product dissolved in a small amount of water. We are also concerned with obtaining certain relative humidities for testing purposes by the use of saturated solutions of pure salts.

The rate of evaporation from a solution of a nonvolatile solid in water is less than the rate for pure water. The reason for the difference is that fewer molecules of water per unit of area are exposed to the atmosphere. Nevertheless, the rate of condensation remains the same, because any molecule of water vapor that strikes the surface is absorbed into the liquid.

Raoult's Law

With a slower rate of evaporation and an unchanged rate of condensation, the vapor pressure is lowered. This relation is expressed in Raoult's law which states that *the partial pressure exerted by a component in a solution is proportional to the mole fraction of that component.* Thus, in mathematical form,

$$p_a = N_a P_a$$

where p_a is the partial pressure of the solution, N_a is the mole fraction of water, and P_a is the vapor pressure of pure water, at a given temperature.

Thus, a very soluble salt will reduce the vapor pressure more than a less soluble salt, when both are present at saturation levels. By choosing salts that are stable in solution and whose solubility does not vary too much with temperature, it is possible to obtain a full range of relative humidity conditions suitable for test purposes. Table II shows some typical salts used in water vapor equilibrium studies.

Note that, **although the equilibrium vapor pressures of the solutions vary with the temperature, the relative humidities do not.** This is because the equilibrium vapor pressure of pure water also varies with the temperature, and the proportion remains the same.

MOISTURE PICKUP BY DRY FOODS

To demonstrate the effect of relative humidity on the moisture pickup, petri dishes containing one of our products — Jell-O — can be suspended in crystallizing (wink) dishes with different saturated solutions in their bottoms. If the crystallizing dishes are covered with glass plates and the dishes stored at a given temperature until equilibrium is reached, the results in Table III will be obtained.

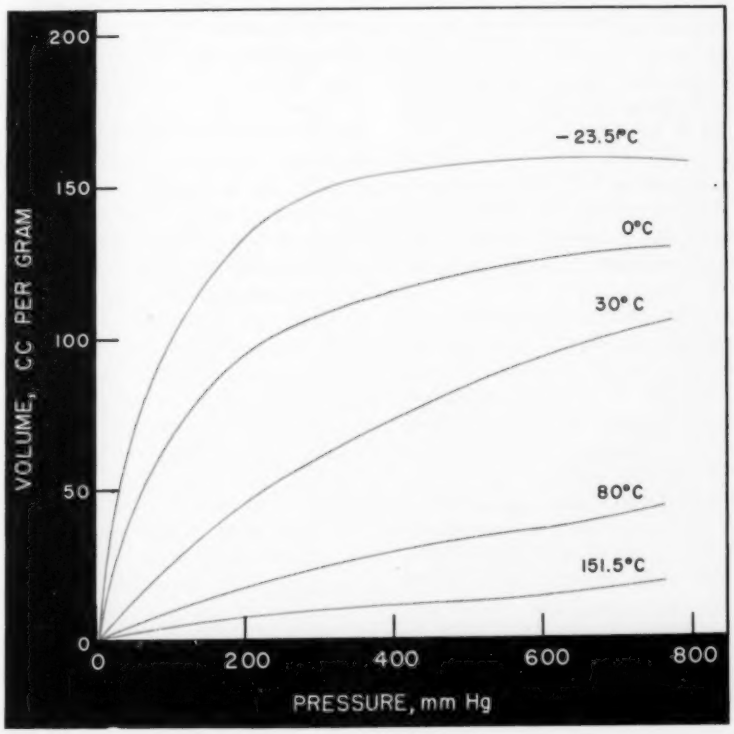
Relative Humidity Important

From these results we can see that relative humidity is the most important factor affecting moisture pickup. Temperature has very little effect; neither does equilibrium vapor pressure. Samples 1 and 2 have different temperatures and different vapor pressures, but the results are the same, while Samples 2 and 4 have the same vapor pressures but the results are different.

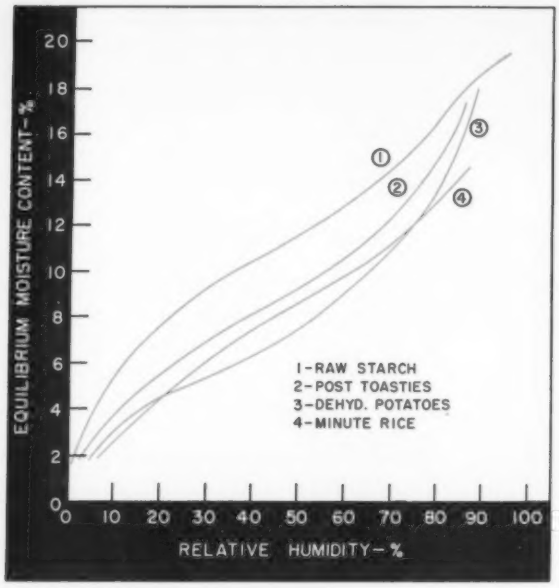
Adsorption

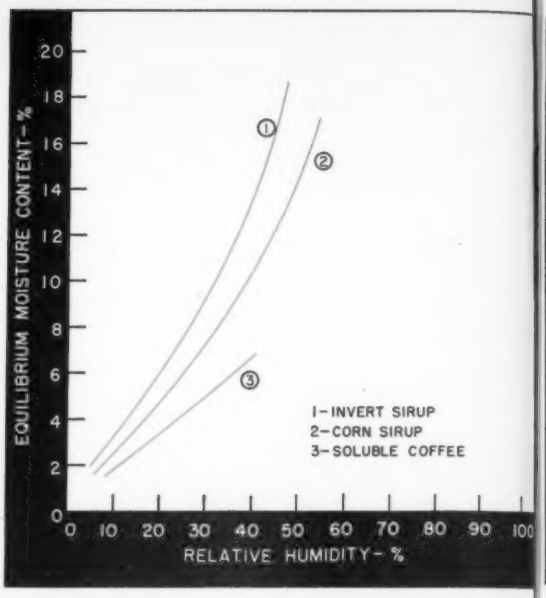
There is a physical force of attraction between a gas and a sol-

ADSORPTION ISOTHERM CURVES . . .



2 . . . FOR AMMONIA ON CHARCOAL showing that adsorption varies inversely with temperature and directly with pressure.





MOISTURE EQUILIBRIUM CURVES . . .

3 . . . FOR CELLULOSIC PRODUCTS

4 . . . FOR ESSENTIALLY SUPERCOOLED LIQUID PRODUCTS

id which results in the gas being adsorbed by the solid. In the case where the gas is water vapor and the solid is a dry food, the moisture is adsorbed as a single molecular layer of water on the surface of the solid. **Below a certain moisture content the adsorptive forces tend to hold moisture in the product regardless of the evaporative forces, and at high relative humidities the adsorptive force overcomes the evaporation force and causes an increase in moisture content.**

Varies with temperature and pressure. In Fig. 2, a typical adsorption isotherm curve (for ammonia gas on charcoal) is shown. It can be seen that the adsorption varies *inversely with temperature* and *directly with pressure*. The fact that adsorption varies inversely with temperature explains the results described in Table III. The equilibrium vapor pressures in Samples 2 and 3 are fairly close, but the temperatures are 100° F. and 35° F. respectively. Thus, in Sample 2 at 100° F. the adsorptive forces are low, allowing the Jell-O to remain dry, while in Sample 3 at 35° F. the adsorptive forces are higher causing the Jell-O to absorb moisture.

If we change the pressure shown in Fig. 2 to relative vapor pressure or relative humidity, we have the equivalent of the regular moisture equilibrium curve used for evaluating the hygroscopicity of foods. Figs. 3, 4, 5 and 6 show typical moisture equilibrium curves. Fig. 3 shows the S-shaped curve typical of cellulosic products. **There is a gradual increase of moisture content with increasing relative humidity, followed by leveling off and finally a sharp rise in moisture content.**

The flat part of the curve can be explained by the fact that, when a single molecular layer of water has been adsorbed, the force holding a second layer is very much weaker than that holding the first layer. Consequently the evaporation rate from the second layer is greatly increased. The result is that there is no further adsorption of water vapor.

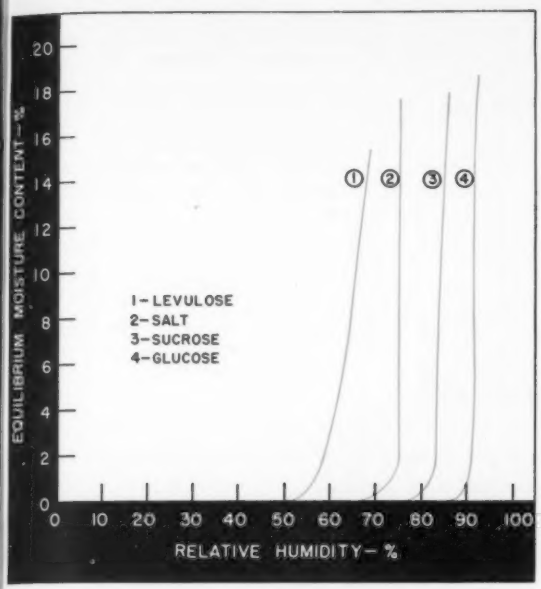
At this point on the curve where the moisture content starts to increase rapidly, the food material has started to dissolve in the adsorbed water, forming a saturated solution. **Since a saturated solution has a low equilibrium vapor pressure, the evaporative force of water in the product is greatly decreased, and water is absorbed rapidly.**

Critical Relative Humidity

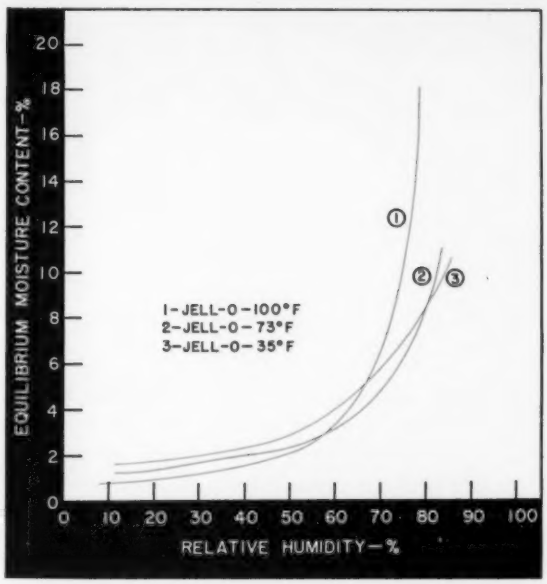
The products whose moisture equilibrium curves are shown in Fig. 4 represent products that are essentially supercooled solutions or glasses. They behave as saturated solutions and absorb moisture rapidly even at the lower relative humidities.

The curves in Fig. 5 represent crystalline compounds that absorb moisture very slowly at first, due to the adsorptive force as explained above, until they reach the critical relative humidity, at which time they behave as saturated solutions. **The critical relative humidity is defined as that relative humidity at which the product becomes unsalable.**

Fig. 6 shows moisture equilibrium curves for Jell-O at different temperatures. They show the relatively slight effect of temperature, especially temperatures below the critical relative humidity.



5 . . . FOR CRYSTALLINE COMPOUNDS



6 . . . FOR A FABRICATED FOOD AT DIFFERENT TEMPERATURES

WATER VAPOR TRANSMISSION THROUGH A PACKAGING MATERIAL

The transmission of water vapor through a packaging film is related to vapor pressure differential and temperature.

Non-Cellulosic Material

If we consider a non-cellulosic packaging material such as aluminum foil, we can think of the sheet of foil as a solid barrier with small pinholes. **If there is a high equilibrium vapor pressure on one side and a low equilibrium vapor pressure on the other side, there will be more molecules of water vapor on the high vapor-pressure side.** As the molecules move around, they occasionally strike a pinhole and move through it to the other side of the barrier.

Reach equilibrium. Since this random transmission will take place more frequently from the high to the low side than in the reverse direction, equilibrium will be reached eventually. Also, a higher temperature will cause more rapid movement of the molecules and, therefore, a higher rate of transmission. Thus, we can say the rate of water vapor transfer through non-cellulosic material is:

1. **Proportional to the vapor-pressure differential.**
2. **A function of temperature.**
3. **Dependent on the permeability of the material.**

Cellulosic Material

In the case of a cellulosic material, such as cellophane, **water vapor is considered to dissolve on one side of the film, move through the film under a concentration gradient, and evaporate on the low pressure side.** The film can be considered as a lattice structure with constantly moving molecules, allowing spaces to form and disappear constantly. Diffusion takes place by the water moving from hole to hole as they appear.

A hydrophilic film will absorb some water from a humid atmosphere, which will tend to plasticize the film, lowering the cohesive forces and increasing the mobility of the molecular chains. With the resulting occurrence of more holes, the diffusion constant will be greatly increased. **Thus, a cellulosic-type film will be affected by the factors noted in 1 and 2 immediately preceding, and it will also be dependent on the average relative humidity of the film.**

SUMMARY

By a review of some of the basic principles of physical chemistry, it is apparent that moisture pickup by a dry product is mainly dependent on relative humidity, and that vapor pressure and temperature have only a relatively small effect. Water vapor transmission through a film is related to vapor-pressure differential and temperature, and in the case of cellulosic-type films, it is also related to average relative humidity of the film.

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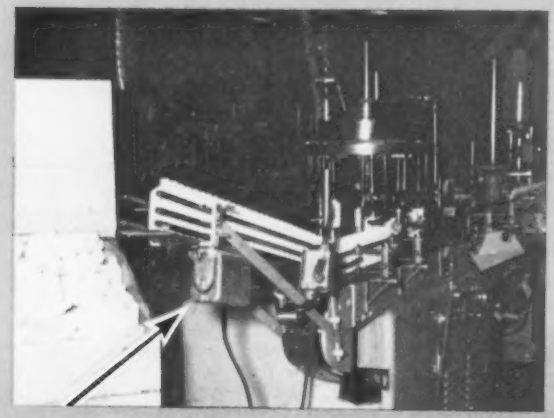
Irvin W. Combs is a graduate of Southern Law University and has been associated with Plough since completing military service during World War II. Since joining Plough he has studied industrial engineering under its in-company program and has completed the methods-time measurement course of the MTM Association. Prior to becoming packaging engineer, Mr. Combs was time study engineer and earlier was in the packaging equipment maintenance department. He is a member of the American Institute of Industrial Engineers.

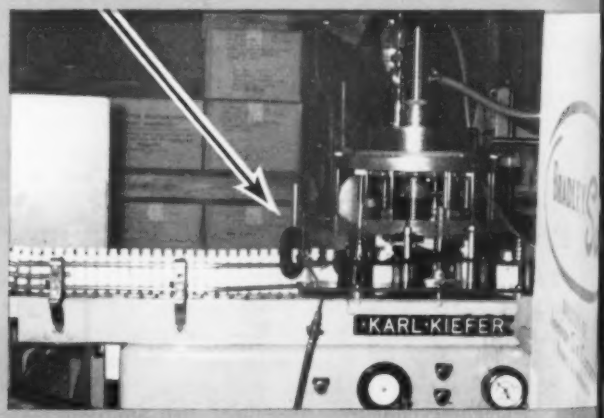
techniques of RUNNING PLASTIC BOTTLES on a multi-purpose line

By Irvin W. Combs *Packaging Engineer, Plough, Inc., Memphis*

Handling plastic bottles requires special attention to prevent excess pressure on bottles moving to and through machinery. Stressing the importance of flexibility and adaptability to various bottle sizes, Mr. Combs reviews these points, and highlights some useful techniques in connection with changeover and change parts.



HEAVY DUTY VIBRATOR (arrow) on inclined infeed conveyor (30°) prevents bottle turnover, provides backlog against filler infeed. Supply hopper (left) holds small quantity. To prevent distortion from heat and pressure, shippers contain just 240 bottles rather than 900 as formerly.



AIR JET STRIKES BOTTLES (arrow) as they enter star wheel which indexes them into filler. Vibration on conveyor, air jet (2 to 5 lb./sq. in.) and incline of conveyor provide pressure necessary to keep bottles moving in a steady flow to filler. Otherwise, because of their lightweight, bottle movement would be irregular.

When anyone accustomed to running glass bottles or metal cans has occasion to operate lines running plastic bottles at production speeds of 80 to 110 bottles/min., he soon learns the importance of careful attention to the special techniques of "squeeze" bottle packaging. And if he is running different products on the same line, he quickly finds the value of systematic procedures concerning changeover and change parts.

On one line, we run a 15-cc. bottle of Mistol mist; a ⅛-oz. bottle of Ril-Sweet concentrated sweetener; 3-, 6- and 12-fl. oz. bottles of Solarcaine, and 4- and 8-oz. bottles of Coppertone suntan lotion, oil and shave lotion—all in plastic bottles. Run lengths vary from 8 hr. to three weeks.

Getting Correct Feed

Since **operational success depends on proper feeding,** we worked out a method of assuring fast, accurate bottle feeding to the 4-pocket star wheel of this line's Kiefer filler. Any speeds above 55 to 60 bottles/min. demand adequate pressure against the infeeding file of bottles.

To provide this pressure and feed we installed a heavy duty Syntron vibrator on the infeed conveyor, positioned at a 30° angle and leading to the infeed of the filler. This vibration (1) prevents bottles from turning over and (2) helps maintain an adequate backlog against the infeed.

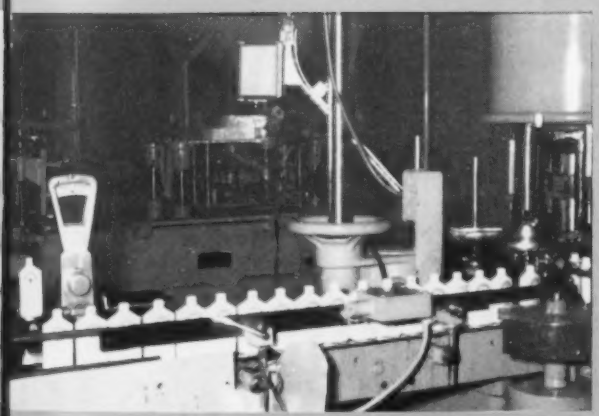
Air Pressure Helps

Also we use an air jet providing 2 to 5 lb./sq. in. pressure aimed at bottles just as they enter the pockets of the star wheel which indexes bottles into the filler. **At production line speeds there simply is not enough travel time to get the bottles into the filler without the assistance of vibration and air pressure.**

A standard machine, our filler has 6 heads, provides pressure fill, positive displacement and has a variable speed control. Bottles when filled index out of the filler, then move to a Consolidated unit which automatically inserts a polyethylene plug into the top of each bottle. There is a heavy duty Syntron vibrator on the infeed of this unit, similar to the vibrator on the bottle feed hopper.

Next, bottles move through a Consolidated capper, then through a Cozzone printer which automatically applies a code number on the bottom of each bottle. From this point, marked and capped bottles move through the flush, side-mount conveyor of the printing unit, then pass to the transfer disc serving the packing table. At this point, girls pack individual bottles in corrugated boxes of various quantities, close and seal them—and direct them through compression equipment, after which they are palletized for movement to storage pending outgoing shipment.

Serving our capper is an off-line innovation of our own. **Because supermarket chains carrying our products of this type insist on our price-marking bottles, we set up a method of doing it.** We mounted a Consolidated cap hopper on a sorting device we devised ourselves. This conveys caps through an Avery labeler which automatically puts a pressure-sensitive price mark label on the top of each cap at 120/min. Stock handlers then transfer marked caps to the hopper of the capper itself—over on the packaging line. (*Turn page.*)



POLYETHYLENE PLUGS ARE INSERTED into filled bottles by equipment at right. As on inclined conveyor to filler, this unit has heavy duty vibrator which assures constant flow of bottles. Plastic bottle characteristics (lightweight and easily distorted by heat and pressure) required special on-the-line techniques.

GUIDE RAIL SETTINGS are critical for proper running of plastic bottles—more so than with glass bottles or metal cans. Pressure of grippers on bottle at capper must be very light. Excess pressure means squeezing. Capper has neck ring to hold bottle while capping chuck retracts.

Running Plastic Bottles

Helpful techniques in handling plastic bottles include **close attention to guide rail settings.** We found these must be precisely correct as they are much more critical than settings for glass bottles or metal cans.

Pressure of the grippers on each bottle at the capper has to be very light. If there is excess pressure here, it usually means you are squeezing the bottle during the cap tightening operation. As a result, there is excess air trapped in the bottle and you get distortion. And to keep pressure on the top or shoulder of each bottle, our capper manufacturer furnished us a neck ring to hold down the bottle while the capping chuck is retracting.

Reduce Case Quantities

Initial experience with plastic bottles led us to specify smaller quantities per case. We now obtain these in cases of 240 bottles/case, in contrast to 900 bottles/case previously. We found that with the larger cases pressure and heat were causing distortion of bottles in the lower areas of the case. These smaller cases offer us a side benefit: We use them as "assorted merchandise" shipping containers.

Production variations prompted us to set up special machine requirements: All filler contact parts are of No. 316 stainless steel, a metal we find adequate even when used with sodium iodine and sodium chlorides.

Varying run lengths and the range of products filled make us pay special attention to changeover and change parts. **We think it essential to have the correct factory-fitted change parts.** Even though we have able engineering and maintenance people in our plant, we think that parts precisely developed by a machinery manufacturer are better than any we could make ourselves. These parts are mandatory if you want fast changeover.

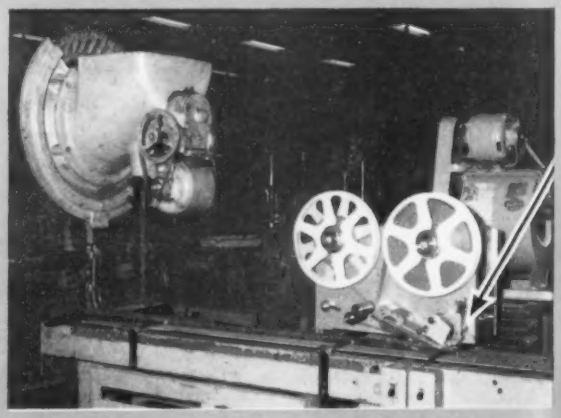
Change-Part Storage

Another important point is the proper storage of change parts. We built special closets and racks for these—adjoining our packaging line area. Parts on these racks are arranged for easy accessibility. To aid quick identification, every part is marked. We specify that the maker of the change part stamp the container size and our code number on each part.

To facilitate changeover itself, our quality control department formulated a special solution for cleaning each filler. We find this careful cleaning essential when changing from product to product, particularly when changing from oils to lotions. It normally takes one half day to changeover a line and prepare it for a different product. This is why we strive to maintain a minimum run length of 8 hr. Whatever your liquid product, development of a **special machine cleaning solution geared to product requirements** should help you change your line over with top speed and thoroughness.

And do not forget the **high value of the change parts** themselves. Often they represent nearly as much of an investment as the basic machine itself. Aside from having adequate storage and protection for them, it pays to handle them carefully, however urgent may be your need of rapid changeover from run to run. (*End*)

BOTTLES MOVE THROUGH PRINTER (right) which codes bottoms. Marked and capped bottles go through flush side-mount conveyor and then by transfer disc to packaging table. After case packing, bottles move through closing and sealing operations prior to storage, pending shipment.



PRICE MARKING OF BOTTLE CAPS takes place on off-line operation. Cap hopper (left) feeds steady flow of caps to labeler (right) which automatically puts pressure-sensitive price-mark label on top of each cap at rate of 120/min. Stock handlers transfer labeled caps to packaging line.

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PROTECTIVE PACKAGING MATERIALS

For more information circle No. 229 on Reader Service Card, Page 79

How management develops people to adjust and maintain machinery

By William R. Fieroh,
Superintendent,
I. J. Gross Noodle Company,
Chicago

Those actually running and attending packaging machinery on the lines can contribute a lot to its maintenance and satisfactory operation, according to Mr. Fieroh, who warns management to watch closely the personality and approach (as well as the technical competence) of those assigned to adjust and maintain these machines. He emphasizes not only the necessity of selecting, training and guiding people to do this work, but also, the importance of assuring the continuity of good relations between these machinery experts and the workers whose machines they oversee.

With each passing year we find fewer and fewer really good maintenance men and adjusters. At the same time, almost any manufacturer's packaging machinery operating costs keep on rising. They will continue to rise because of inevitable downtime and the accompanying length of time it takes to get machinery back in operation following a stoppage. **This time is often long because there is a lack of key people and adjusters who know how to do the job quickly.**

When members of top and general management realize just how important these machinery specialists are to the overall company operation, they take real interest and provide enough follow-through to make sure of such work being properly done by adequately prepared and equipped people.

Most executives underestimate the importance of people who operate and attend these machines on the packaging lines. Most of them can contribute a lot more than they now do to the task of preventing breakdowns and of getting "down" machinery back in the running as quickly as possible. First line supervisors and the men who adjust and maintain machinery hold the key to just how effectively a company uses its potential for machinery adjustment.

Further, the difference between a really good machine adjuster and a mediocre one is worth noting. Anyone who doesn't think so should compare the difference in length of time it takes one to get machinery running again as compared to the other. Still more interesting are the reasons for this difference.

Use A Friendly Approach

A major point here is that a good repairman or adjuster will talk over the breakdown or difficulty with the workers at the machine—at the time he is repairing or adjusting it. The adjuster who gets along with people and goes about his work in a friendly way gets a lot more information and help from the line workers than the one who does not. But there is another real benefit here: Observing the reactions of crew members to all this activity makes possible spotting people with keen interest or natural aptitude for machinery work.

If you accept the people on the line for their real worth and can interest them in offering suggestions, experiences and opinions, you will find just how much help they can be. Anyone who doesn't think so should try it for himself.

But in developing a new machinery adjuster, mere aptitude and enthusiasm are not enough. There must be some sort of training, and this is often a hard problem for the small company. Sometimes you can run an in-plant course, or there may be a night school training program. Sometimes this education is available at a vocational school, technical institute or even at the collegiate level. **The main point is that it is a good investment for a company to finance the appropriate training of its potential machinery experts.**

Work With Suppliers

Don't overlook close cooperation with the manufacturers of packaging machinery. They can be very

Direction – And Follow-Through

Stressing the importance of providing proper guidance (and facilities) for intermediate supervisors, Mr. Fieroh urges care in identifying and developing machine adjusters, maintenance specialists and first-line supervisors. In practical terms he tells how to apply "human relations" in maintaining operating conditions conducive to peak production. Bringing to this discussion the viewpoint of the man-on-the-firing-line, as well as that of the first-line supervisor, Mr. Dizonno complements Mr. Fieroh's observations by reviewing a number of helpful operating practices and stressing the requirements and attention necessary in carrying them out. Mr. Dizonno's article begins on the next page.

helpful. More often than not there is not enough contact between the engineers and designers who plan and build a machine and those in the user plant who must run it. Especially where the machinery builder is reasonably near your plant, there is a real opportunity to give your own people some worthwhile education.

Once you have ordered some unit of new machinery, you might ask its manufacturer to let some of your people visit his plant **as your particular machine nears the final stages of manufacture.** It would help your supervisors and technicians to exchange ideas with the supplier's engineers. It would certainly enhance their ability to get the new machine running as quickly as possible following its installation in your plant.

Sharing In-Plant Information

Hand in hand with this is the importance of making sure the specialists in your own plant share information with the machinery adjusters. There usually are specialists with electrical experience and machine shop background. **One approach might be to have a two-hour meeting each week in the plant, with talks by the foremen or heads of different departments.** Discussions by electrical experts, steam fitters, maintenance specialists, sheet metal men, or shop supervisors, to give a few examples, definitely contribute to the training of machinery adjusters.

The adjusters get a lot of specialized information this way. **More important, they learn they are part of a team and that they can count on the help of these experts in their different areas.** It may seem elaborate to do all this for machinery adjusters, but even the most casual study of downtime (including comparison of good and mediocre machinery repair work) should prove it very worthwhile.

Find The Best People

Sometimes the problem is one of personnel selection. Supervisors and management must be alert to men with aptitude and enthusiasm—men who might not come to light unless consciously searched out. It pays dividends to spot these men—and then advance them as fast as their capabilities permit.

Locating these aptitudes themselves is not easy. There are many requirements. Management must remember that an effective packaging machinery adjuster must be able to do a certain amount of planning in order to anticipate breakdowns and a need of part replacement, and must have good eyes and ears, as well as mental capacity. Not enough has been said about the importance of *sound* in packaging machinery supervision. A trained ear is a very effective tool. Mr. Dizonno will discuss this point at length, summarizing a number of important functions and purposes involved in systematic listening to packaging machinery.

The man who can locate or anticipate a potential breakdown before it occurs is a man worth cultivating and having around. It is necessary to find these men and bring them around those less interested in such opportunities for advancement. And once having found these potential experts, we must give them the facilities and opportunity for development. Both the company and the individual will benefit greatly. (*End*)

William R. Fieroh has been associated with I. J. Grass Noodle Company for 19 years. Prior to that, for 13 years, he was with Triangle Package Machinery Company on installation and "road" work. His engineering and operational training is largely the result of experience and machine shop work. During his years in his present capacity, he has been responsible for a number of packaging machinery developments.

What a machinery adjuster should know—and do

By Michael Diconno,
Night Foreman,
I. J. Grass Noodle Company,
Chicago

A machinery adjuster has two principal jobs: (1) Keeping his equipment running and (2) getting it going again as quickly as possible when stoppages occur. But the main task is to avoid stoppages in the first place. Therefore, he is ever alert to things that can cause stoppages, and he trains himself to anticipate trouble.

Once something happens, speed, with full safety precaution, becomes all important. **The difference between a good adjuster and a poor one is the knack of spotting the trouble quickly and holding the downtime to a minimum while he corrects the difficulty.** A good adjuster learns to look first at the package (once a jam or stoppage occurs) to spot clues that lead him to the areas of the machine where trouble is happening.

And since the ability to spot trouble depends on watching for the differences and the exceptions, it is very important for a machine man to have the knack of keeping track of normal operation. Few people without actual experience in packaging machinery realize how important sounds are. A good machinery man can do an effective job simply by listening. **His ear is so well attuned to all normal sounds that he is quick to spot something unusual.** Since the use of a good listening ear is important throughout the packaging operation, let's take a closer look at the job of *listening* before we turn to specific tasks of maintenance and adjustment.

WHY SOUNDS ARE IMPORTANT

If you have a product dropping into a package, you learn to recognize a distinctive and regular sound. One of our products has vegetable oil and chicken fat which are contained in a gelatin shell about half the size of a golf ball. In the course of an automatic filling operation, these items drop into packages being filled. A normal dropping has such a distinctive sound that even with the hum of running machinery it is easy to tell 20 to 30 ft. away whether the dropping is taking place normally or not. An unusual rhythm might indicate something is wrong.

An adjuster must school himself to let these normal sounds become second nature. As a result, if there is any change in the rhythm or characteristic sound of such a dropping action, he is alert to it.

This is true of a variety of packaging equipment. For example, let's take carton formers. Where carton blanks are expanded by vacuum, you can tell by the sound whether the vacuum is functioning properly. If there is not enough vacuum, or if there is a leak or something else is wrong, this is at once apparent to the man whose ear is conditioned to these normal sounds. Obviously, we have vacuum gauges, but the sound may give a man a clue that something is happening even when he is not watching the machine.

Note The Differences

To take another example, the action of an overwrapping machine involves a number of distinctive clicks. You can hear the normal action quite clearly. Anything out of the ordinary immediately catches your ear. A good adjuster may detect a rubbing of machine arms. He may hear a distinctive sound resulting from too much pressure on the carton. If the carton is too high in the elevator, the normal sound will not occur. A pressure bar may fail to hold a carton and so you may hear a carton smash.

A good machinery man can tell instantly when someone has changed the speed of the machine. If there is too much or not enough momentum, he can spot it. He hears the machine labor. He can tell if the carton is being elevated too high or not high enough.

More important, since they offer clues of immediate danger, are such sounds as metal rubbing on metal. **As one gains experience in machinery work, he learns to recognize the sounds of different metals.** Some experts tell accurately and quickly what kind of metal is rubbing merely by the sound. Spring steel has a characteristic ring to it. Brass has its own sound. Or there may be a distinctive rhythmic clicking.

Give Squeaks Priority

The sound of metal rubbing on metal, or a definite squeak, can be a danger signal. A rubbing of parts may indicate their being dry or out of position. An experienced machinery man chases down a squeak at once. He does not even wait for the lunch or break period, but goes

after it immediately. If necessary, he stops his machine then and there.

Trouble is that a squeak may develop a freezing up of moving parts caused by a dry condition. Or parts may be wearing. You may hear board rubbing on steel, or steel on steel. It may take even a good adjuster 30 to 90 min. locating a squeak. But he spends this much time in order to locate the squeak without stopping the equipment. He knows how important it is to keep up sustained production and he knows how expensive downtime can be. While he never takes any chances on damage to machinery and always stops it when necessary, **he capitalizes on every chance to find the trouble without stopping his equipment.**

Interpreting Sounds

Sounds tell many things to an expert. As he hears package stock going through and listens to the overwrapping operation, he can tell at once if there is too much pressure at the heaters. The sound is different. And he is particularly alert to changes in the pattern or combination of characteristic sounds. He learns to recognize the *differences.*

For example, he often can tell when a part "starts to go" because it hits harder electrically. If a piece is worn, it moves too far or doesn't move properly. As a result, the solenoid working with it has to work harder. It has farther to travel, or there is more strain on it. You can tell by the strain and pull on a solenoid what is making it work harder. A good man tracks this down immediately even though it proves to be simply a lack of lubrication—which he takes care of readily.

Michael Dizonno undertook machine shop training at Chicago's Washburne Trade School following his high school work. During World War II he was a baker in the Navy. Since joining the Grass organization, he was a machinery adjuster prior to his promotion to night foreman.

The important thing is to use sound as a listening tool to keep track of equipment without stopping it. Further, a trained ear frees one's eyes and hands for other jobs. Listening to machinery that he is not looking at becomes second nature to an expert.

STUDY PACKAGES THEMSELVES

But when trouble occurs, he then looks closely at the package itself. It usually offers a clue to just what the trouble is and tells him where to start looking. A close look at a carton may reveal a dent or scrape indicating the carton is hitting a rail or meeting some point of wear. More often than not, trouble of this sort is at the *start* of a machine operation. Most jams trace back to trouble there. If the unit gets out of timing or if a package smashes because of not being in proper position, it is usually because something is wrong at the start of its movement through the machine.

As our adjusters gain experience in machinery work, they learn that **if the package gets a correct start through the machine, it usually moves through in correct position.** If a package jams while going through, it is usually because of something having happened incorrectly at the start.

Vacuum Difficulties

A carton must be in correct position when it enters its first cycle through a machine. For example, suppose there is trouble at the vacuum cups. If they are worn, or if one cup is worn and the other is not, the carton hits a rail and is pulled off on one side. This is because there is not enough power to pull it all the way. **The condition of the package at its first movement may be a clue that something is wrong at the point of vacuum application.**

Where a vacuum action is used, a good adjuster learns to watch his vacuum pump filter. If it is dirty, it does not give full power. Running into trouble here, an experienced man (1) checks his filter. If that is all right, he (2) looks at his vacuum cups and (3) finally at the clips. If filter and cups seem all right, it may be that the clips are bent.

Suppose the trouble is happening on just one carrier of a machine. This indicates the difficulty is at the clips. But if it is happening on all carriers, no one clip can be blamed, and it is probable the trouble is at the pump.

What separates a good adjuster from a mediocre one is his ability to do these things in right sequence and to decide what to do in order not to hold up production. A man has to develop a feel for solving these problems on the production line without impairing normal operations.

Detecting Smashes

Other instances of package position difficulties bear watching. A flat carton blank may not go all the way into the carrier. Incidentally, people sometimes forget that rails

The knack of listening for characteristic sounds (and changes in them—thus indicating trouble) is of primary importance to anyone charged with keeping packaging machinery running, according to Mr. Dizonno. He also stresses the importance of a correct start of a package through machinery. When something is wrong, he suggests looking at the package itself for a clue to the machinery trouble needing attention. As a former adjuster, now a first-line supervisor, his practical suggestions, in effect, outline a training program for machinery adjusters.

are not designed to push a carton, but are merely intended to hold it gently in position without applying pressure. But if a carton gets out of line, there is pressure, and a smash results. A carton may smash because a bolt or bar stays in place. Or the guide rails may be correctly adjusted at the start, but the timing may get out of adjustment.

Similarly, if a cam is not lubricated, it may wear and slip. Or you might move a set screw accidentally. Then you are in trouble. **A good adjuster has to realize he is dealing with precision machinery.** Everything must time properly, and he must realize he has no tolerances to work with.

CLEANING, LUBRICATION

This suggests attention to **keeping machinery clean and well lubricated.** This not only must be done, but at the right time. A competent adjuster cleans his machine heaters, for example, at the breaks during the day so that he does not have to disrupt production. Further, he knows there are different types of cleaning jobs.

In some instances he avoids turning an air hose on a machine because it may blow product particles into the mechanism. On the other hand, some sort of hand cleaning may be necessary every two hours—with a thorough cleaning at night or after the last shift of operation. The man wanting to be a successful machinery adjuster must remember that *very small particles* can cause trouble. A piece of glue can catch on a sheet of film. Something may get out of position. Foreign fragments may get into roll stock.

It is necessary to be conscious of these little things that can cause trouble. Much depends on developing the right attitude toward this sort of work and its emphasis on meticulous cleaning and lubrication.

Check Up On Gluing

Hand in hand with keeping the machine clean is proper care of any gluing equipment. One aspect of doing this is keeping the glue wheel properly positioned. On machinery of this type, for example, it is important not to expose too much of the wheel and to keep it above the halfway mark so that it is always in wet glue. Another approach is to make sure the gluepot is kept full—refilling it, say, every 20 min.

An adjuster must know that glue changes from morning to night. It thickens up during the hours it stands in the gluepot, and may be unusable at the end of the day. On equipment such as case sealers, this is particularly a problem because the gluepots are larger and may hold four to five hours' supply of glue. Another problem is that you may let the level in the pot get down too low, thus causing a drying out of the glue. **In all equipment where glue is involved, adjusters have to be alert to excesses or accumulations of it here and there and take whatever precautions necessary to avoid these excesses at a given machine.**

Another phase of the cleaning of machinery may be to scrape off the glue rolls from time to time. It is important not to let it get too thick. Likewise, there may be a building up of wax or other particles. As conditions require, a machine adjuster may scrape these off every two hours or so. The important thing is, he does what it takes to keep machinery clean and operating normally.

Knack Of Oiling Machines

A simple guide to lubrication is to oil anything that moves or can wear. In every instance, put a drop of oil on it. Greasing, on the other hand, is done strictly by the manufacturer's manual. In other words, the adjuster is careful to follow whatever instruction the manufacturer has furnished concerning the lubrication of its machinery. But adequate oiling is done often and regularly, perhaps twice during a shift, or even more often, if necessary.

At the same time, adjusters must

(*Continued on Page 86*)

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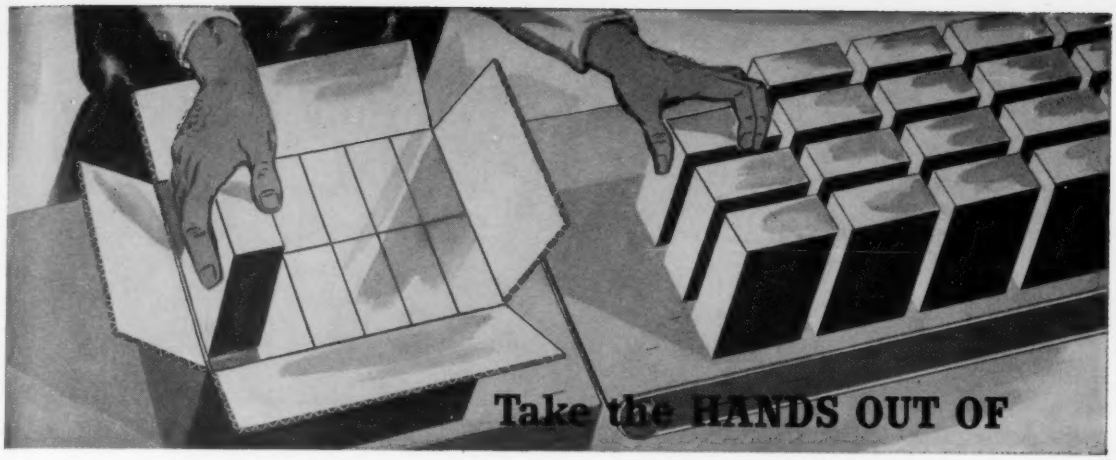

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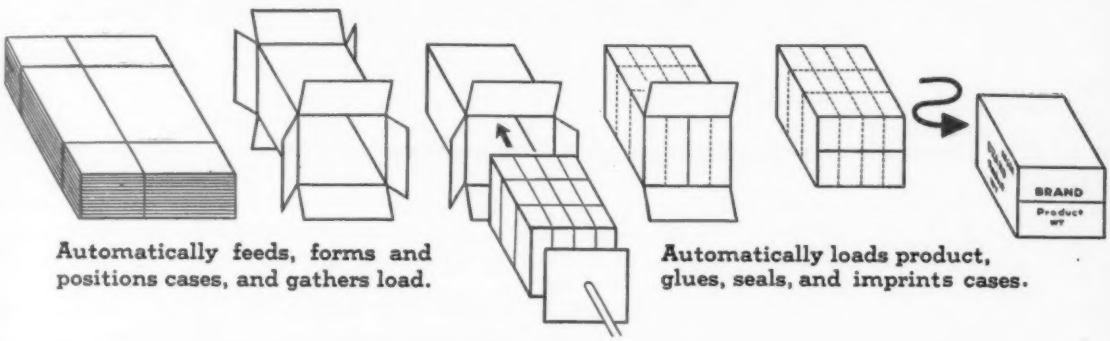

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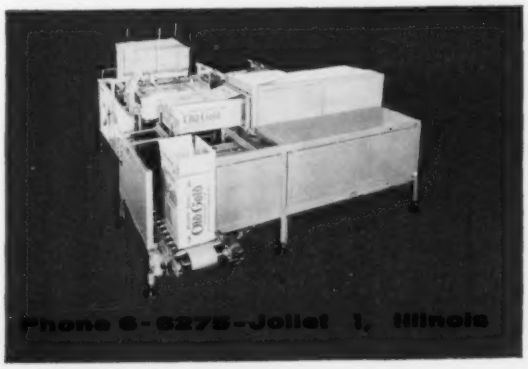
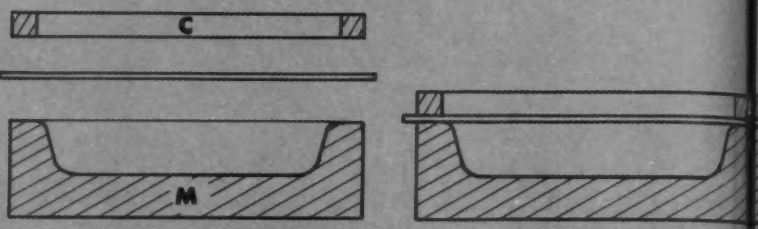




Sheet is positioned between mold (M) and clamp (C).

Clamp and mold come together and hold sheet over cavity.

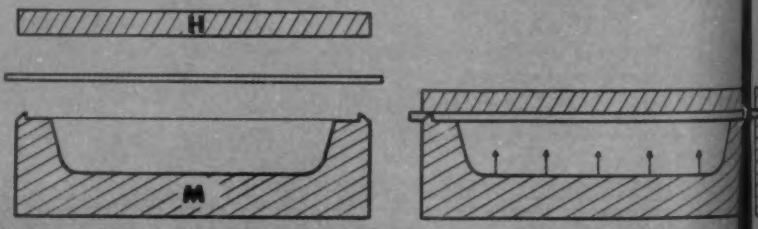
Fig. 2. Vacuum forming of biaxially oriented polystyrene

Part II: Thermoforming cycle
Vacuum and pressure forming
Mechanical forming

Oriented polystyrene sheet

By Merlin L. Evans,
Development Engineer, Research Department, Plax Corporation, Hartford, Connecticut

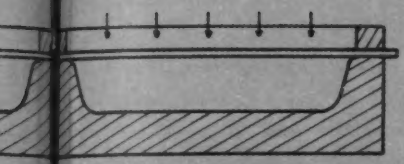
In the first part of this article, which appeared in last month's issue, Mr. Evans discussed various properties and applications of oriented polystyrene, pointing out that biaxial orientation produces a flexible and tough material. Also, in a complementary article last month, he reviewed some fundamentals of orientation as applicable to thermoforming requirements for polystyrene. Here he describes several methods — vacuum and pressure thermoforming and mechanical forming — of forming the thicker gauges into different shapes. He gives pointers on such techniques as clamping the sheet properly, controlling the temperature, mold materials, undercuts, vent holes in the molds, and so on.



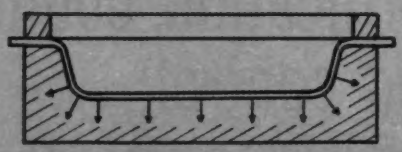
Sheet is positioned between mold (M) and heating platen (H).

Sheet is simultaneously forced a clamped against heating platen.

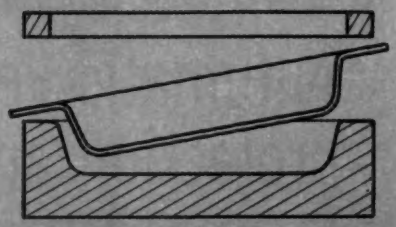
Fig. 3. Pressure forming of biaxially oriented polystyrene



...eet is heated (from above) to form-...g temperature.



Evacuation of entrapped air (arrows) pulls sheet against cooled mold.



After cooling, package is removed for trimming.

As pointed out in the first part of this article, biaxial orientation of polystyrene results in a material which retains desirable features, yet is flexible and tough. Because of these and other properties (discussed in Part I), the thicker gauges can be formed into boxes, cups, and other shapes, by several methods which are explained in this, the second part of the article.

THERMOFORMING

Thermoforming is any forming method which employs both heat and differential air pressure to form an article. Methods commonly used with oriented polystyrene include vacuum and pressure forming, and slight variations thereof.

A typical forming cycle consists of positioning the sheet, clamping the edges, applying heat, forcing it into the mold with vacuum or pressure, cooling the formed article, removing the article from the mold, and trimming it.

Requires Rigid Clamping

The basic structure of oriented polystyrene requires that the sheet be rigidly clamped throughout the forming cycle. Otherwise, the elastic memory of the sheet will cause the sheet to revert to its original dimensions (prior to orientation) when heated to the heat-distortion temperature of approximately 210° F.

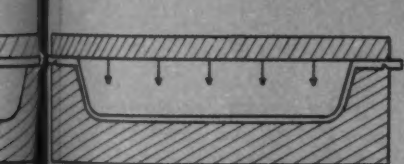
The necessity for clamping the edges can be demonstrated by heating a 6-in. diameter blank to the forming temperature of 220° to 240°F., and watching the blank shrink back to approximately 2 in. in diameter while it becomes nine times the original thickness.

Temperature Control

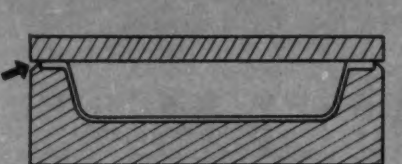
Controlled heating during the forming cycle is essential to prevent bursting in forming, provide maximum wall uniformity, and assure product uniformity from cycle to cycle. When the vacuum or compressed air is applied, hot areas in the sheet stretch faster than the cooler areas. This results in very thin sections or even fractures from the hot areas, while the cool areas stretch more slowly and produce a thick wall. **In areas which require a heavy wall, a screen filter may be placed between the heating element and the sheet to reduce the heat effect.** This is called "shaded" heating.

Although the heating element is by far the most critical temperature affecting forming, outside drafts can deform articles. Usually, difficulty is encountered from air jets near the heating platen, such as from the air used in ejecting the package. Large vacuum-formed articles are also susceptible to cold drafts in the shop.

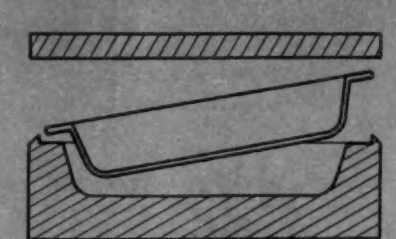
Mold temperature control is generally not required. In a continuous operation, the mold will reach a temperature equilibrium in the



...d a... Air pressure (arrows) drives heated ...n. sheet into mold.



After cooling, knife (arrow) trims edges as mold closes.



Mold opens and completed package is ejected.

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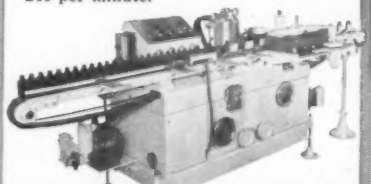

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range of 125° to 150°F. In some cases where heavy gauge sheet is formed, cooling is done by water lines cast or machined in the mold.

Forming-Grade Sheet

Two forming grades of sheet are available with stress levels tailored for vacuum and pressure forming. Although general-purpose sheet can be formed, the forming-grade sheet is easier to handle and more economical to fabricate. Other special grades can be produced for specific forming methods and equipment.

Materials For Molds

The mold material depends upon the purpose for which the mold is to be used. Wood, plaster, and plastic are commonly used in experimental and short runs, whereas a metal, ferrous or nonferrous, is generally used in molds for longer runs.

The nonmetallic materials mentioned are easy to produce, repair, or alter, but reduce the production rate substantially because they are very poor heat conductors. The plastics, cast phenolic, cast-filled epoxy, and furane resins, have good abrasion resistance and a smooth, nonporous surface. Epoxy is used to coat wood and prevent shrinkage from moisture absorption. Poplar, which is sugar-free, is less susceptible to "mark-off" than most woods, and is best for molds that are not coated with epoxy.

Aluminum, which is a good heat conductor, easily machined, lightweight, and familiar to patternmakers, is often used for permanent molds. Pressure-cast aluminum molds produce excellent finishes and hold close dimensions. Steel molds are more scratch-resistant than aluminum. In addition to casting, metallic molds are produced by sprayed metal, electroforming, and machining methods.

The mold design is determined by the product requirements. In general, it is the same for oriented polystyrene as for other thermoplastics. The depth of draw, without assist, for 0.010-in. sheet, is limited to an increase in area of approximately 100 per cent of the size of the forming blank. This depends upon the thickness of the sheet and the amount of localized stretching, as found in undercuts.

Undercuts

Articles containing small undercuts can be ejected by air since oriented polystyrene shrinks 0.008 in./in. during forming. For example, a 4-in. diameter lid could be ejected by air if the undercut were no larger than 0.016 in. (2×0.008 in.) on the radius. **Undercuts exceeding this shrinkage leeway require a mechanical assist.** For instance, on the 4-in. diameter lid, a concentric assist 3 in. in diameter would be incorporated into the mold. The plug would be raised to form a recessed center in the lid. This recessed area hides "mark-off" from the plug, strengthens the lid, and enhances the lid design. The plug should be approximately ½-in. from the undercut so as not to form a shearing action during lid ejection.

Vent Holes

The size of the vent holes in the mold will be as large as, or larger than, the holes used in forming other thermoplastic sheets of equivalent gauge. When in doubt as to the best size, a 1/32-in. drill may be used as a start for vacuum forming; a No. 76 drill (0.020 in.), for pressure forming.

The number of holes should be a minimum of 1/cu. in. of mold volume. The greatest concentration of holes should be in the area of the mold which is the last to make contact with the sheet, e.g., corners.

VACUUM FORMING

Heating Cycle Has Two Phases

The heating cycle of the sheet in vacuum forming is composed of two distinct phases:

1. **The warm-up period.**
2. **The dwell time.**

The warm-up period is that period in which the sheet is heated from room temperature to the heat-distortion temperature. This phase is characterized by contortions in the sheet, caused by thermal expansion on the side of the sheet next to the heaters, and restrictions on the cooler side of the sheet. At the heat-distortion temperature, the unmolding stresses reduce the buckling activity to a drum-tight sheet.

During the "dwell" period, the temperature is increased from the heat-distortion point to the forming temperature, without spectacular visual change in the sheet. **Care should be taken to keep the dwell time as short as possible, since orientation is lost through relaxation at these temperatures.** With the exception of the forming of large articles, it may be hard to distinguish between the two phases of the heating cycle.

Straight Vacuum Forming

An illustration of straight vacuum forming is shown in Fig. 2. The sheet is clamped over a female cavity which is provided with vent holes for evacuating the air in the cavity. The clamped sheet is uniformly heated to forming temperature, after which air is evacuated from the mold, drawing the sheet into the cavity. After a short cooling period, the formed article is removed from the clamp and trimmed.

Several variations of straight vacuum forming are used in forming oriented polystyrene. **Drape forming** deviates from straight vacuum forming in that the clamped sheet is heated above the mold. When the sheet has reached forming temperature, it is draped over the mold, and after an air-tight seal is effected, vacuum is applied. Drape assist gives an inverted wall thickness as compared to straight vacuum forming; however, it normally results in more waste material.

Straight vacuum forming is advantageous for shallow draws as it permits closer spacing between cavities and eliminates the drape operation, thus increasing yield and decreasing cycle time. Other variations of vacuum forming include the use of plugs and rings.

(Turn page)

Vacuum forming is used to form blister-, or dome-type packages which do not require deep draws, sharp detail, or undercuts—such as used in packaging toys, baking goods, hardware, and similar items.

PRESSURE FORMING

A typical example of pressure forming is shown in Fig. 3. The sheet is positioned between the heating platen and the mold cavity. Compressed air enters the vents in the cavity and forces the sheet against the heated platen. Simultaneously, the sheet is clamped to the heating platen by the knife edge of the mold. When the sheet has reached forming temperatures, it is blown into the mold by compressed air from vents in the heating platen. Pressure up to 300 lb./sq. in. may be used when intricate detail is desired. After the article is cooled, the cam-controlled mold advances 0.25 in., trimming the article. The piece is then ejected by compressed air.

Special tooling adaptations such as movable heating platens, concave or convex heating surfaces, a separate trimming operation, plug assists, and articulated molds, constitute variations which produce special effects, at high tool costs.

Contact Heating

Contact heating illustrated in pressure forming offers three advantages over radiant methods:

1. **Heater-to-sheet contact** gives a faster, and more even, transfer of heat, allowing an increase in cycle speed.
2. **Frictional forces between the heating platen and the oriented sheet** prevent unmolding that might result from the elastic memory of the plastic.
3. **Surface contact** gives added support and allows heating of the sheet to a higher forming temperature, which is sometimes necessary for mold detail.

Knife-Edge Clamping Technique

The knife-edge clamping technique used in pressure forming lends itself to trimming in the mold and minimizes the scrap loss, thus giving a high yield. A uniform flange can easily be left on an article if it is desired, or the flange can be trimmed off without repositioning the article; however, a flange adds rigidity and prevents warping. Pressure forming is superior to vacuum forming in obtaining greater mold detail, decreasing cycle time, and reducing scrap losses.

Blister and contour packages may be made by the pressure forming method; however, this method is more widely used to produce trays and closures when intricate detail is required. Snap-on lids are produced for use on plastic and paper containers. Another type of closure is made for aluminum containers.

In a closure forming operation which varies somewhat from Fig. 3, a machine using six molds produces preprinted lids from 0.010-in. sheet, in a 5-sec. cycle at the rate of 72/min. *(4)*. In fact, production runs have been reported to be producing lids in a 4-sec. cycle at a rate of 90 to 100 lids/min. Cycle time is decreased when thinner gauge sheet is used.

Uses Of Thermoformed Containers And Closures

Containers and closures are now commercially available for such uses as packaging fresh fruits and vegetables, processed meats, prepared foods, ice cream, and frozen meats and vegetables. Small dishes have been designed to hold individual servings of prepared foods for use in automats, hospitals, dormitories, institutions, and drive-in restaurants.

The high WVTR of oriented polystyrene at room temperature is greatly reduced at freezing temperatures. This, combined with the material's low-temperature properties, makes frozen food packaging a market for formed trays.

Closures for formed polystyrene packages consist primarily of overwrap, snap-on lids, and heat-sealed lids with variations for packages of a particular design. In overwrapping, the formed tray and contents are enclosed with oriented polystyrene or other commercial film, and heat sealed on commercial equipment.

Formed lids with a snap-on lip provide a good seal without use of heat or solvent. These lids are produced in a variety of sizes and shapes utilizing several snap-on designs.

Heat sealing is used for strong, complete seals in a wide range of thicknesses. A crimped seal, employing both mechanical pressure and heat, is used to seal blanks on formed containers at the rate of 45 pieces/min. Impulse heat sealing produces a sound weld and is widely used. Another method allows two cooled parallel bars to make contact with the sheet, and a third bar, heated, is lowered between the chilled bars, effecting the seal.

MECHANICAL FORMING

Mechanical forming of oriented polystyrene sheet is accomplished with or without the aid of heat, depending upon the application. **Where heat is employed, the plastic temperature is held below the heat-distortion point and in the approximate range of 190° to 200° F.** A fold at angles up to 180° can be effected without using heat.

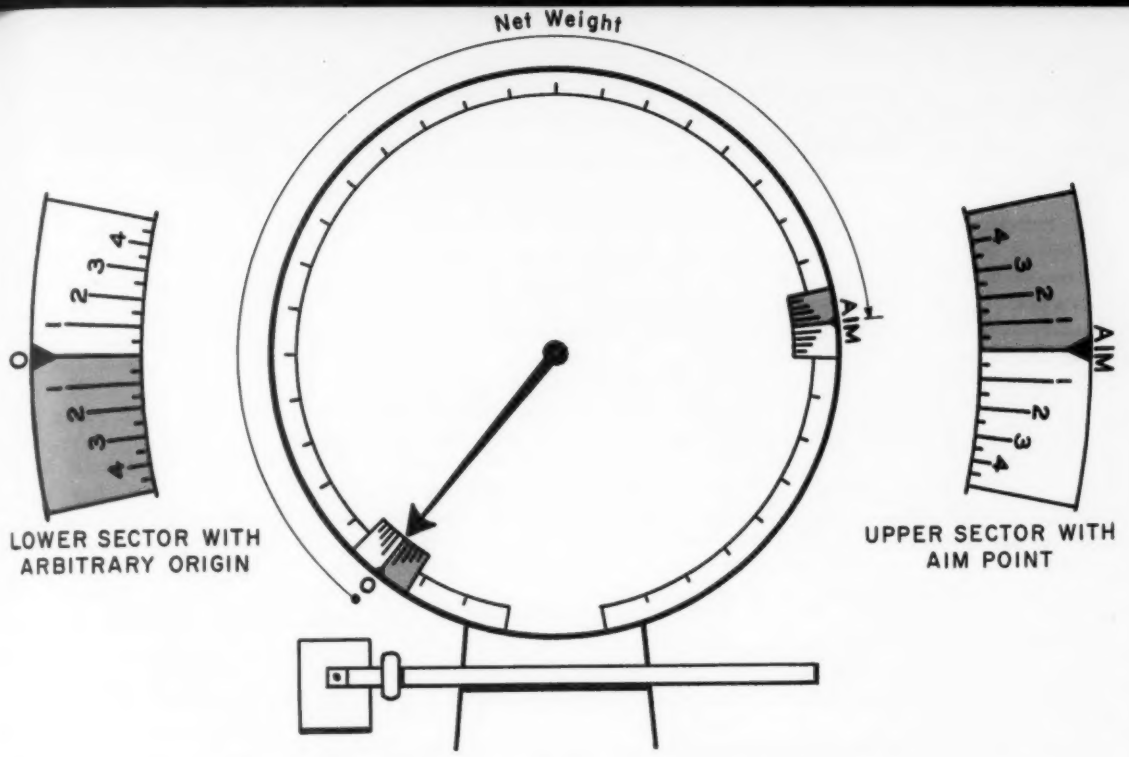
Heat is generally used, however, in folding, creasing, and beading, to obtain better results. Formed boxes are produced by blanking out the sheet, then creasing along the edges by pressing the blank into a heavy, sponge-rubber pad, using a heated punch. Oriented sheet is beaded for producing cylindrical containers with circular paperboard bottoms. The beaded lip is placed on the blank before the sheet is solvent-sealed in the cylindrical shape; the paperboard then rests on the bead.

Strip forming of oriented polystyrene is a continuous mechanical forming operation. A narrow strip of sheet is drawn through a heated U-shaped die, then cooled in this shape by being pulled through a cooling die. Continuous forming of beads may be accomplished by the same method.

Covers and trays are mechanically formed by pushing a preheated circular- or rectangular-

(*Continued on Page 89*)

Editor's note—In Part I of Mr. Evan's article, August, 1959, p. 43, Table III, "Air" should read "CO_2" and "CO_2" should read "Air."



REFERENCE SECTORS superimposed on standard dial scale. Operator simply takes reading on "O" sector, fills until pointer indicates *same number in corresponding color* on "AIM" sector.

Control net weight by taring each container

Applicable especially to large containers with great empty weight variation, this simple, inexpensive method uses standard dial scale with special "sectors," eliminates arithmetic or scale adjustment for each weighing, is about as fast as using average tare and standard gross weight.

By Thomas T. Polke,
Quality Control Engineer,
Midland Division Quality Control Staff,
The Dow Chemical Company,
Midland, Michigan

Filling containers with a specified weight of product has always presented problems to the manufacturer. Because of variables in weighing, a company is constantly striving to minimize underfill and overfill, or the net-weight variation. The sources of variation in weighing operations are basically three:

1. Human error in filling.
2. Inaccuracy of the scale.
3. Inadequency of control procedure.

Variation due to the first two sources can readily be minimized by training and maintenance. The third is less easily resolved. **The factor which contributes most to the problems in net-weight control methods is the variation in empty package weights.** When empty packages vary widely in weight, net-weight variation can become a real problem, and the choice of control methods becomes especially important.

Achieve Control Two Ways

Net-weight control can be achieved in two ways:

1. A tare weighing system.
2. A "statistical" method.

When using the tare weighing system, the contents of a package are essentially weighed independently of the container. This is done by special weighing equipment, preweighing containers, or by

manual adjustment of ordinary scales. The drawback is either expense for special equipment or loss of time with the manual method.

In individual situations, either or both of these drawbacks make the use of tare weighing methods impractical. Nevertheless, because the influence of empty container weight variation is removed, the tare weighing methods offer the best opportunity for good net-weight control, and should be used if at all possible.

In the "statistical" method, a package is filled to a standard gross weight which is determined by adding the average empty container weight to the desired net weight of contents. This method of control appears less expensive than automatic tare weighing, and is faster than the manual adjustment methods.

Disadvantages here, however, are obvious. The average tare weight must be known. This requires sampling of incoming empty containers, and some uncertainty is involved in getting representative samples. Also, this method produces packages of constant gross weight. The weights of the contents vary to compensate for container weight fluctuations. Thus, it is not known how much product is in an individual container.

Depending on the accuracy of the tare weight used, it is possible to have a constant bias in a lot of containers. And depending upon the distribution of container weights, it is possible for the contents of an individual container or groups of containers to be a great deal under or over the net weight. Such underfill or overfill can be critical from the standpoint of specification or costly give-away of product.

Develop Simple Method

We have developed a method which permits the filling of containers to a given net weight by use of the tare weighing principle, but without the necessity for special scales or manual adjustment of ordinary scales for each container. **The procedure is both simple and rapid. There is no calculation on the part of the operator, and the risk of operator errors is minimized. What is more, the procedure is achieved on ordinary dial scales and requires no special accessories or adjustment in the mechanism.**

The method is especially applicable in the cases where large containers which have a considerable variation in empty weight are used. Good examples of these are steel drums* and palletized paper cartons. However, the procedure is equally good for any type of container, large or small.

The methodology for this weight-control process is given below. Slight variations and embellishments are possible with the use of special scales. This procedure, however, is concerned with the application to the common dial scale with the fixed glass face and no accessories.

Scope

This method is intended for use in filling containers where empty weight variation is large or unknown, and automatic taring or metering devices are not used.

*A 100 per cent weight inspection on incoming 55-gal. drums revealed that, in ten carloads (approximately 3000 drums) representing several manufacturers and different lots, individual drums varied between 44 and 53.5 lb. actual weight. Averages of carloads varied widely within and between suppliers.

Equipment

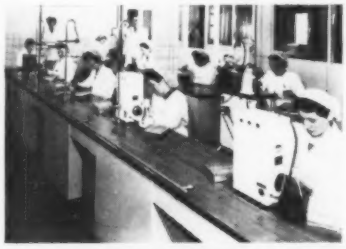
A dial scale of suitable capacity should be equipped with **reference sectors** appropriately placed for the net weight required. Details of these sectors are shown in the illustration. The sectors may be printed on a good grade of white paper and affixed to the scale face with a suitable adhesive. The adhesive should not be of the type which will release upon aging and permit curling of the edges. Ordinary rubber cement, such as is used in most offices, has been found to be satisfactory. It will permit easy removal without injury to the enamel on the scale dial, yet provides a good bond.

The sectors should be drawn clearly and lines should be as distinct as possible. Usually a facsimile of the regular markings on the dial is suitable. However, the style or arrangement of numbers can be altered for easier reading. **The span of the reference sectors should be wider than anticipated variation in container weights.** This will vary with containers.

The "0" sector should be superimposed on the dial at some point near the bottom of the scale (but not necessarily at zero). To avoid parallax effects when reading the scale, the sectors should be affixed directly to the dial rather than to the glass. A point at about 10 or 15 units is usually convenient to read, and permits ample swing of the pointer to the minus side of the zero point.

The sector designated as "AIM" should be placed so that it is centered at a point which is higher by the amount of the net weight to be used. In the case where several different net weights are to be weighed on the same scale, e.g., 50, 75, and 100 lb., an "AIM" sector may be affixed to the proper position for each. If the net weight to be weighed on the scale is to be changed often, an "AIM" sector which can be clipped anywhere on the dial edge could be devised. This would be most advantageous where the scale is equipped with a hinged scroll. (*Turn page*)

Thomas T. Polke is a graduate of Cleary College in business administration. He also attended The University of Michigan engineering college prior to his military service during World War II. With Dow since his graduation, he has been in statistical quality control since 1954 and became quality control engineer in 1957. Mr. Polke is a member of American Society for Quality Control and the Dow Quality Society.



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Procedure

To use this method of net weight control, **the scale must first be set for the approximate average tare weight of the containers.** A drum or carton from the stock to be used is placed on the platform of the scale. Then the sliding weight on the tare bar is moved so that the pointer indicates "0" on the lower reference sector. The sliding weight is locked in this position. If after subsequent weighings it is seen that the first drum selected was of an extreme weight, causing the majority of other containers to deviate widely, the scale may be readjusted to balance at the arbitrary origin with a more typical empty container.

The container is then filled until the pointer reaches the "AIM" point on the upper sector. Subject only to the error of the scale and the operator, the proper "net weight" has been added to the container. This container has been tared and filled individually, and the filling is accurate within scale and reading error limits.

Subsequent containers are placed on the scale platform and the position of the pointer "0" sector is noted. If the container weighs exactly as much as the first, the pointer will read 0. If the weight is greater by two units, the pointer will read +2 in the white area; if less by 3 units, −3 in the red part of the sector.

The container is then filled until the pointer indicates the *corresponding number* in the *corresponding field of color* in the "AIM" sector. Again, only the desired net weight has been added to the container.

This operation is very rapid and requires no confusing arithmetic on the part of the operator. He merely remembers to fill to a number in a *color* area. Thus, if the container is 3 units heavier than the arbitrary zero, he reads "three in the white" on the "0" sector, and then fills until the scale reads "three in the white" in the "AIM" sector. If the empty container weighs a unit less than the arbitrary origin in the "0" sector, the operator reads "one in the red," and then proceeds to fill until the scale reads "one in the red" in the upper, or "AIM," sector.

The result of this sytem is net weight-control by individual taring, and it eliminates the need for either arithmetic or adjustment of the scale for each weighing as required by other manual methods. There should be no time loss. In fact, this method can be almost as rapid as when using an average tare weight and a standard gross weight.

Practical Advantages

The amount of error involved in net weight by this technique is dependent upon two factors only—operator error and scale error. Operator error can result from two causes:

1. Failure to read the initial reference point properly.
2. Failure to weigh to the correct aim point.

The latter cause of operator error is common to all manual weighing systems, and is best controlled by proper training. The first source does not exist under a "set tare" system, but generally, such reading error is much less than the empty container weight variation which is eliminated. **This advantage, plus the elimination of frequent weighing of empty drums to determine an average tare, and the attendant errors and extra handling, makes the method more accurate and economical as well.**

Special Considerations

Containers should be labeled as to *net weight*. Gross weights should not be imprinted. An *average* tare, if necessary, should be determined by occasional sampling of incoming containers. Then an "average gross weight" may be calculated quickly when needed.

The method outlined here can do a real job of controlling *net weight* which is, after all, what we expect to be correct. The method is uncomplicated and inexpensive and can be installed readily with no increase in work load. (*End*)

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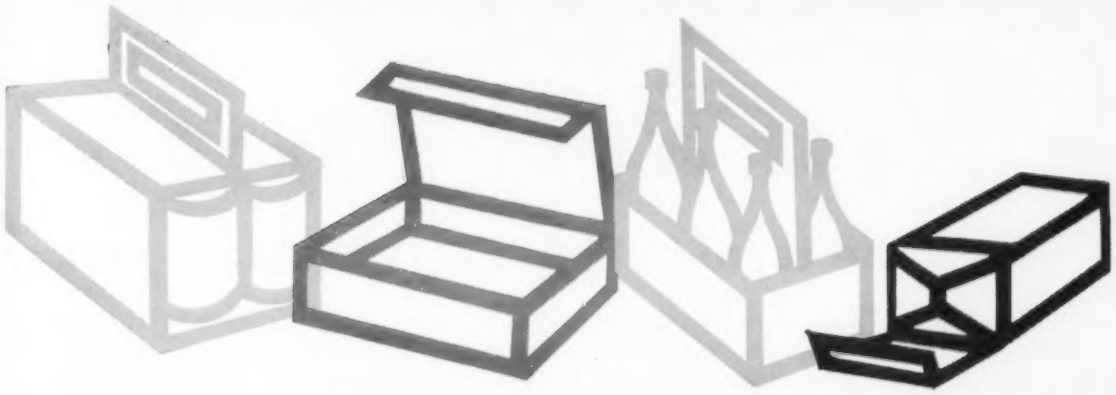

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As companies spend increasingly more money on packaging equipment and facilities, and as packaging operations become increasingly complex, long range planning becomes correspondingly important. The old concept of a one-year budget is now outmoded. More and more companies find it necessary to think in terms of longer intervals—perhaps three or more years. To develop programs for packaging expenditures over such intervals, articulate planning is essential. But often it meets much resistance. Experts in all areas of a company concerned with packaging find it easy to keep up with—and accept—equipment and material advances, but sometimes hard to adopt new ways of thinking. Companies already engaged in long range planning find it offers immediate and future benefits.

Are you ready for long range planning?

Whether we think in terms of individual units of packaging machinery, complete lines, or whole new plants, the growing intricacies of today's business operations are forcing companies to plan for these expenditures more articulately and more carefully than ever before. Discussions with executives of companies engaged in long range planning show clearly that such planning is rapidly becoming an absolute must. Without long range planning, they say, expenditures occur haphazardly and result in purchases that fail to consider *overall* needs of a business.

Boards of directors and company officers who must approve expenditures are finding that a one-year budget is no longer adequate. Reports indicate that companies operating under one-year budgets (without definite long range plans) have no real ideas of what they wish to accomplish. A lot of what passes for "planning" is nothing more than a collection of haphazard estimates plus an unorganized accumulation of rather casual top-level conversations.

Judging by critical comments of various executives, we get the impression that industry generally does a very poor planning job. **An underlying reason for this deficiency is that an operating or production head or other executive concerned with packaging gets no credit for planning.** He gets credit only for production. But, as executives now doing advanced planning indicate, 90 per cent of his being able to produce depends on his ability to plan. Developing programs for expenditures on a long range basis is a sure way of making one plan more carefully.

Three Key Steps

In a nutshell, under long range planning, (1) the company's goals are defined, (2) these goals are translated into aims of all departments, divisions or plants of the company, (3) the problems of these departments, divisions, or plants are defined. At this point, attention is focused on the problems that the company must overcome to accomplish its goals.

In short, goals are first established. Then it is determined if it is possible at any cost to attain these goals with the present facilities and organization. All operations must be broken down into their respective parts in order to do these things, but care must be exercised not to get lost in unnecessary details. In this stage the only concern is with what is to be accomplished; the specific details of how it is to be accomplished will be worked out later.

The next question follows naturally. **How much will it cost, (operating cost only) to attain these goals?** Some goals may present problems such that they could not be attained at any cost with the present facilities and organization. It is important to bring these problems into focus.

With these problems and costs before you, **the next move is to develop solutions for them.** These solutions should be ideal from the standpoint of the individual department, division, or plant. When an "ideal" solution is spoken of, it refers to the most economical solution. This is necessary, and many of the solutions may not be practical when other departments, divisions or plants are taken into consideration. But in the compromising between departments that is to follow in order to work out an overall practical solution, everyone must know what the ideal solution for department "X" would have

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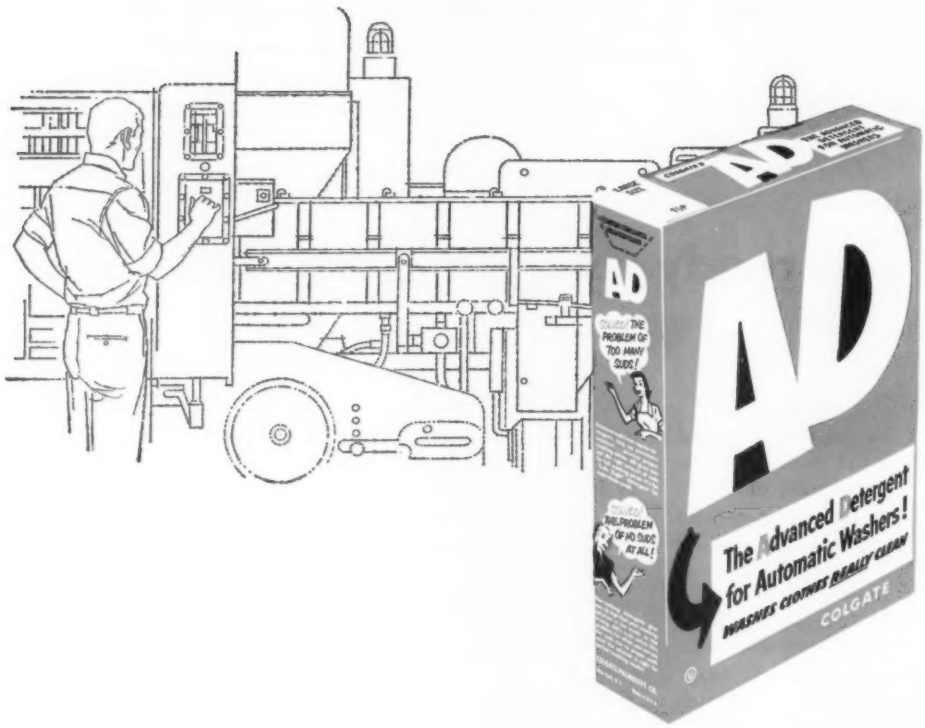

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been. **It is often surprising how close to these ideal solutions the final practical solution will be.**

As has already been mentioned, the next step is to take all of these ideal solutions of the various departments and weld them into an overall practical solution in order to attain the goals set for the company. **This is a process of compromise between departments and is one of the most important steps in the entire process.** Open minds and logical thinking will be required of all participating. Overall economy is the goal. New ideas, overcoming old traditional methods of operation, can often be the real answer to a company's problems at this point. This achievement in itself can be very worthwhile.

Moving ahead again, the cost of all physical changes, i.e., plant and/or equipment, necessary in order to achieve this practical solution must be calculated. **And then one of the most important things, the organization or people to operate it, must be planned.** An organization must be planned around the process to fit the needs of the process and is not just any grouping of personnel.

From here calculations must be made as to the cost of operations of this facility with this organization. Now a full and complete picture has been developed, and management knows just exactly what is necessary and when it will be needed in order to attain its goals.

Long Vs. Short Range

There is a big distinction between developing an ideal long range plan for one's department and simply working out an immediate program or a specific justification for new packaging line equipment. When this is done in terms of long range planning, no one is "arguing" with top management, or with other department heads or colleagues when advocating certain plans, whether they be facilities, equipment or methods. Rather each one is simply stating the ideal way for his department to reach a given objective.

A key feature of long range planning is that it removes a lot of the guesswork inherent in so-called "normal" planning. Often much planning involves little more than top-of-the-head sales estimates for certain products or lines. Often sales forecasts are offered "plus or minus" something or another. With a more careful planning process, forecasts are more solid. And under today's conditions the little bit "plus or minus" is no longer acceptable.

Under the long range planning process no one is hamstrung, but he has to be on solid ground, staying away as much as he can from generalities. Thus avoiding loose statements, a typical manager in a company engaged in long range planning finds himself making only assertions he can prove. He knows (or may have learned from experience) that if his statements are not provable, he may find them disproved in his presence—in a planning meeting.

Justification Problems

Without getting down to specific companies or citing individual cases, the point is that **long range planning considers all factors as a totality.** It looks at aspects of sales, accounting, management, production, warehousing, shipping, and so on. **Packaging executives can no longer plan lines and develop machinery acquisition programs in a vacuum or merely in terms of the packaging department alone.**

At the same time, long range planning lets one avoid the big bugaboo of *justification* of expenditure by a department or production head. Under traditional practices, each man makes his own justification. He does this without reference to other departments or divisions. As a result, something often goes wrong.

Suppose you, as a department head, prepare an articulate justification for a certain operation of line. Another does the same thing for one of his proposed operations. The effect of his recommendation is that his proposed changes cost you part of your justification. Because of what he does, assuming his recommendations materialize, you do not get the justification you were counting on.

But in contrast, when all these things are worked out in terms of an articulate, long range planning process, the difficulties arising with an individual or departmental conflicts are avoided. Taking an overall point of view, department heads look at things together. There is less likelihood of anyone being trapped in the situation described above. This is because a long range plan brings all these things into focus for top management. **There is no reason or need for an individual justification because the various justifications are all part of the long range plan.**

Operations Research

Specialists in planning point out that a significant phase of long range planning is applying operations research to planning. They warn against indiscriminate use of this term, pointing out that it is often a source of confusion. Some executives shy away from it because of its supposed mysteries. Or they may get lost in the intricacies of its terminology. Others may try to use it as a sounding board or an instrument of praise of their own particular accomplishments.

Men experienced in long range planning say that the operations research techniques are nothing more than the application of mathematical logic to problems of industry. At the same time they warn against being overwhelmed by complications. They point out that what you are doing is reasoning out the most probable solution to the problem in question. To attempt to solve some problems may involve highly complicated mathematical computations that will require the services of specialists, but many problems can be reduced to simple formulation that can be handled without too much trouble.

For example, you apply mathematical logic to work out, say, a production curve to meet the peak demand of a sales forecast. You know that your chances of hitting a sales forecast based on informa-

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tion and experience are subject to a certain probability. You know of your own ability to meet demands for product with available production facilities. As a result, you develop a pretty good idea of your probability of meeting the sales forecast.

But it becomes important to know the variabilities of production results. There is a big difference between the expected and the possible production line curves. It may be possible to attain a certain level of production, but 97 per cent of the time you would expect your production to be below this level. On the other hand, the expected level of production may be at some lower level, one you would expect to attain, or surpass, 84 per cent of the time.

Distinctions To Note

Here is where the subtleties of the planning process come in. Although you figure your production as indicated above, you have to figure shipping and warehousing facilities on the basis of *possible* rather than expected production—in order to cover contingencies. **Executives skilled in long range planning note the distinctions separating packaging and production from warehousing and shipping: The first two can anticipate a certain percentage of excess over the peak, while the last two cannot.**

We are told that a "first step" in long range planning is to get the premises of management concerning what it expects (or hopes) to do with the various items of production. In any company, production and packaging must follow certain public trends, i.e., market acceptance of various products, and so on. There are many ways of finding out what packages and products are likely to sell and in what quantities. All sorts of forecasts, data on living standards, census material, and similar information come into play.

The big point, according to experts, is to keep all this information up-to-date so that management knows where it is going. They say that this boils down to a long range planning operation for an entire company or for an entire division. Doing it permits setting up the background properly and orderly when preparing for coming changes, product sales trends, et al. They say that if you do this, you find out what changes will effect, say, production and packaging operations and just how they do.

Demands New Viewpoint

In working out packaging and production facilities under a long range planning approach, you are planning on a physical and equipment basis, rather than on a money basis. Such a process permits the gearing of packaging to what the other operations are doing and where they are going. Everything must mesh together. Experts also say that it makes you analyze your activities as completely as possible and do this in terms of immediate realities as well as ultimate or long range plans.

Those assigned to do the planning may find that members of management, and of the organization generally, are not used to thinking in the terms of long range planning. **They learn that planning, and planning alone, provides them with uninterrupted efficient operations.** They also learn that it is not sufficient alone just to plan and allot the use of company money. For this money to be used to the best advantage, it is necessary to have its use properly integrated into the overall long range planning in a physical sense so that continued economic operations can be achieved.

Only in the proper balance of facilities and money can the company remain in a desirable profit position. The process of determining the requirements of the company's goals and what it will cost to build facilities, equip them, and operate them in order to attain these goals, as has been previously described, will result in the manager, or managers, concerned having a complete picture along with the justification to present to top management.

Hard To Change Thinking

Companies now involved in long range planning warn that progress is extremely slow. Basic thinking has to be changed, and planners have to allow time for new concepts to sink in. This may take months. **Experienced executives point out that there is considerable resistance to bringing about a change of basic thinking as contrasted to a change of a purely technical or specific character, say, of equipment or method.**

They note that many projects often are summarily dismissed with an "it can't be done." The approach and framework of a long range planning process usually leads to questioning rather than accepting such a summary dismissal. This leads to a search for possibilities of just how it can be done.

Still another aspect of long range planning is that it gives department heads a better chance to express themselves. They are not inhibited or held within the confines, say, of justifying a certain equipment purchase. They do not have to hold back because of their knowing that certain members of top management or certain directors of the company are personally opposed to things these executives feel they should have in connection with their individual justifications. **Since they are merely stating the ideal or long range way to accomplish the goals, as noted above, they are not arguing with anyone.**

Sifting Of Information

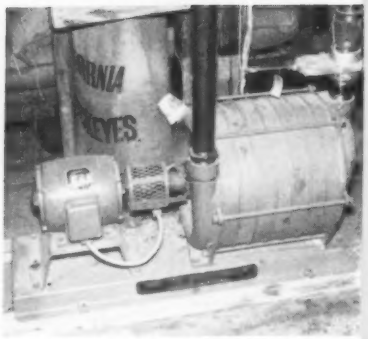
Those getting into planning for the first time must realize there will be a lot of skeletal or even misleading information coming forth at first. Experts in planning warn that initial answers will be very much off-the-cuff. Later, a refining process takes place. Those offering the generalizations or vague figures or answers either reconsider these on their own initiative or they are asked to reconsider them in order to get a certain subject on more

(*Continued on Page 89*)

Dean A. Broadhead is a graduate of the University of Idaho with a B. S. degree in agriculture and an M. S. degree. Prior to entering the bean business, he taught vocational agriculture for five years. Mr. Broadhead was general manager of Bean Growers Warehouse Association, and general manager and treasurer of Western States Bean Cooperative before joining the N. K. Hurst Company in 1949 as vice president. He is a past president of the Western Bean Dealers Association..

Vacuum system frees packaging line of spilled beans

By **Dean A. Broadhead** *Vice President, N. K. Hurst Company, Indianapolis*

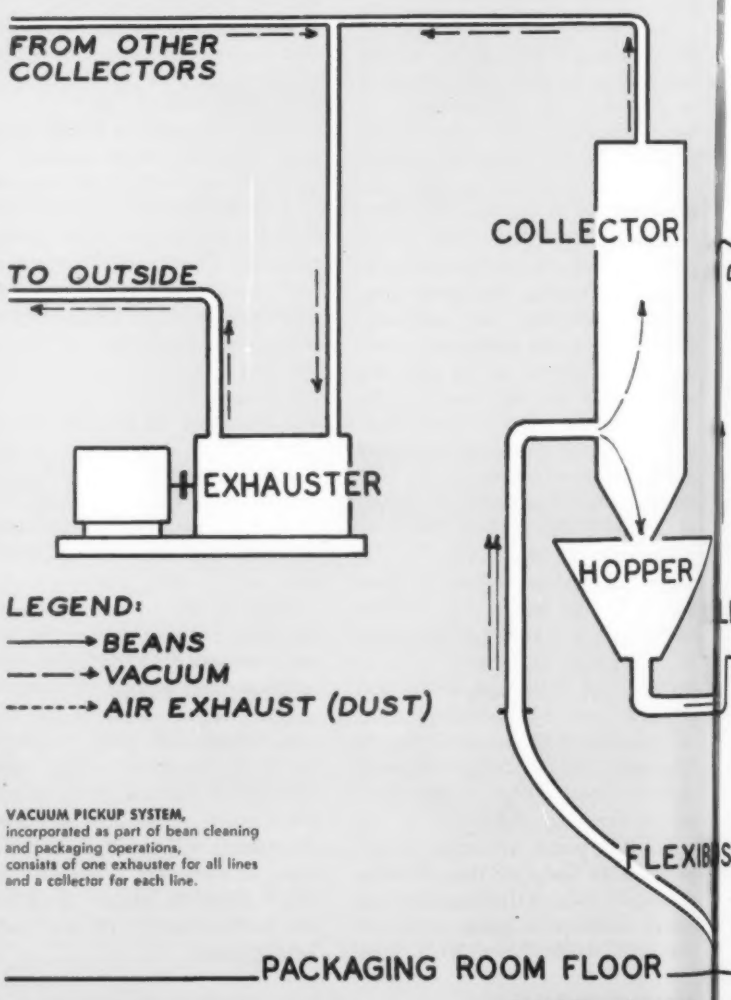


EXHAUSTER runs continuously and maintains vacuum in outlets located in packaging room.

In a bean packaging operation, it is impossible not to "spill the beans" once in awhile. And when there are 20 different varieties of beans, peas, and lentils, it is difficult to attain the segregation of beans which is absolutely necessary. With our new system of picking up the spilled beans by vacuum, we have eliminated the chances of mixing varieties and have increased our packaging line efficiency, all resulting in important advantages, as summarized elsewhere in this article.

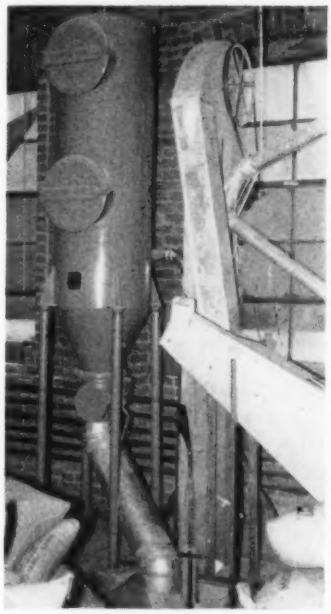
Each of our packaging lines has two Vertipak bagging machines which form, fill, and seal the polyethylene bags. Occasionally, a bag breaks, spilling literally hundreds of beans. To prevent one variety on a line from becoming mixed with another on an adjacent line, when a bag breaks, each line is "fenced in" with a partition approximately 1½ ft. high. It is essential, however, that these spilled beans be picked up as quickly as possible; or eventually the operators would be walking on the beans, causing excessive damage by breakage.

Have many changeovers. With 20 different varieties of product, we average from three to four change-

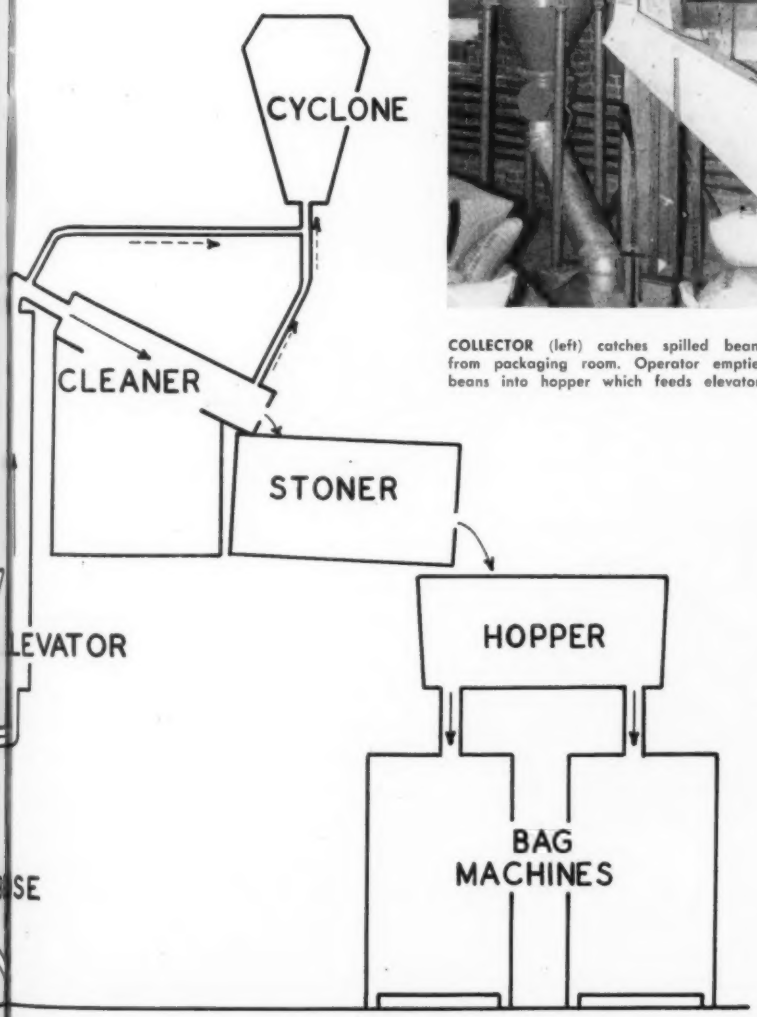


VACUUM PICKUP SYSTEM, incorporated as part of bean cleaning and packaging operations, consists of one exhauster for all lines and a collector for each line.

Keeping many varieties of a product such as beans segregated on the packaging line at all times is absolutely necessary, but it can be a difficult task. Describing the old method and the recently installed vacuum system for picking up beans unavoidably spilled on its packaging lines, Mr. Broadhead explains that the company has gained many advantages from its new vacuum method—a saving of 20 man-hours per 8-hour shift, positive assurance that varieties are not mixed, reduction in cleanup time for changeovers, and freedom from excessive dust.



COLLECTOR (left) catches spilled beans from packaging room. Operator empties beans into hopper which feeds elevator.



overs per line per 8-hr. shift. For each changeover, it is necessary to remove every bean from the machines and the surrounding area of the line before starting a different variety.

Old Method

Our old method of keeping the beans "in order" was to use a Tornado blower to blow the beans spilled on one line, into a corner of the area, and then scoop them into 100-lb. burlap bags. These bags were then carried upstairs manually where the beans could be fed into the bean cleaner and stoner, and down to the packaging machines.

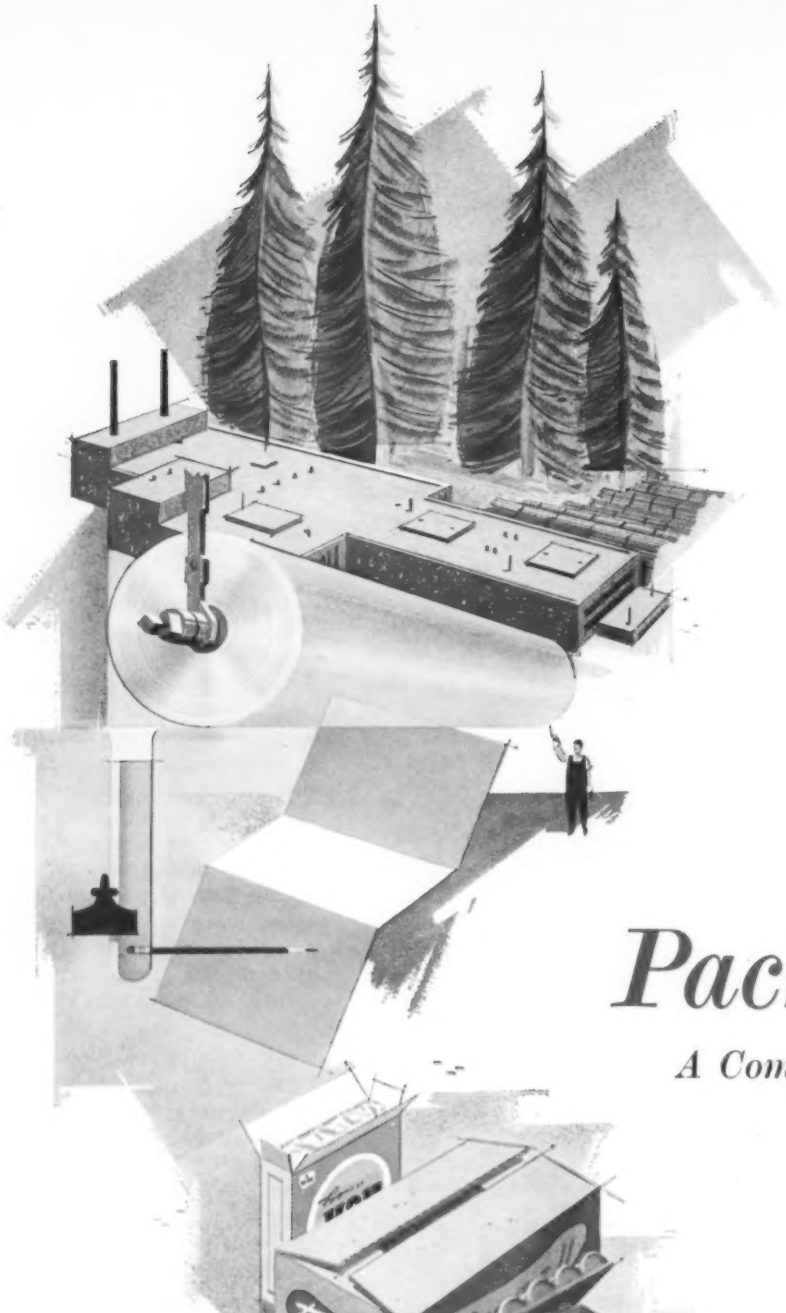
Necessary to tag bags. To be certain not to mix varieties, and since we were not always sure that these bags would be dumped right away, it was necessary to tag them with the variety of bean. (It was possible for some of these bags to be stored until the next time the specific variety was run.)

To minimize the amount of beans spilled on the floor when a bag broke on a packaging machine, we had a hopper in the floor under each machine. Again, we were constantly having to empty these hoppers, bag the beans, tag the bags, and carry them upstairs (two flights) to recirculate the beans through the system back to the packaging machines. These hoppers had to be thoroughly cleaned out when changing over to another bean variety.

Install Vacuum Pick-Up System

After studying the problem of picking up spilled beans, we concluded that a vacuum "pick-up" method was the answer. We installed a U. S. Hoffman vacuum system consisting of one exhauster sufficient for all of the packaging lines. Each line has its own bean collector, however. Equipped with a 5-hp. motor, the exhauster has ample capacity for operating two cleaning hoses each of which is 2½ in. in diameter and 12½ ft. long.

Referring to the flow diagram, the exhauster is located on the floor above the packaging line



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Users of packaging, whether their requirements are large or small, regional or national, can now benefit from the expanded services offered by Packaging Corporation of America. Complete integration — from vast timberlands, through 8 mills and 41 converting plants — assures dependable delivery . . . consistently high product quality.

Each of the merging companies — all approximately equal in size . . . each a major supplier in its own region — brings its own special productive abilities. Now, Packaging Corporation of America offers the coordinated facilities, the broad geographic coverage and the talents of over 7,000 experienced men and women as a complete packaging service.
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DOW

Plastiatrics in packaging

DOW'S CLINICAL APPROACH TO HEALTHY PLASTICS APPLICATION

VARIABLE DENSITY, SELF-EXPANDING PELASPAN ABSORBS HIGH ENERGY SHOCK

FIG. 1 Package made from Pelaspan protects fragile microphone

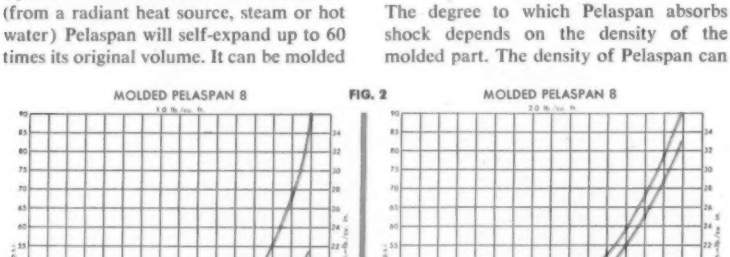
Expanded polystyrene has proved to be an ideal medium for the protective packaging of fragile objects. The cellular structure and high compressive strength of this plastic foam provide positive absorption of external shock; and its extremely light weight often means substantial savings in shipping costs.

Pelaspan® is Dow's expandable polystyrene in bead form. Under moderate heat (from a radiant heat source, steam or hot water) Pelaspan will self-expand up to 60 times its original volume. It can be molded to almost any size or shape. Figure 1 shows a delicate TV microphone and its "shock package" molded from Pelaspan. Because of the plastic's excellent moldability, complex contours can be matched exactly, eliminating the danger of possible damage from slipping within the package. Pelaspan beads can be dyed before molding to add any of a large number of attractive colors to the foamed part, if desired.

The degree to which Pelaspan absorbs shock depends on the density of the molded part. The density of Pelaspan can be varied from 1 to 10 pounds per cubic foot during the foaming stage, providing a packaging material which can be tailored to whatever degree of protection against shock is desired. The curves in Figure 2 illustrate the change in energy absorption with a change in density of packages molded from Pelaspan. The energy absorption curves were derived by plotting the area under the stress-strain curve versus the strain. By analyzing these curves, the correct density can easily be chosen to give the required degree of shock absorption.

In Dow's continuing series of Plastiatrics studies, Dow Technical Service Engineers have developed energy absorption curves for a range of densities of packages molded from Pelaspan. The data resulting from these studies will greatly assist plastics engineers and molders in solving packaging problems. Data and complete information are available on request. Write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Department 2172DH9.

FIG. 2



Energy absorption varies with change in density of packages molded from Pelaspan

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STYRON ® 666
STYRON 689 (Easy Flow)

MEDIUM IMPACT
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STYRON 475
STYRON 440 (Heat Resistant)
STYRON 440M (Easy Flow)
STYRON 480 (Extra-High Impact)

HEAT RESISTANT
STYRON 683
STYRON 700

PELASPAN

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

CLEANER AND STONER feeds beans to hopper on packaging machines. Product which spills during packaging operation is picked up by vacuum system and recirculated through cleaning operation.

room. By a system of pipelines, the intake side of the exhauster is connected to the bean collector, also on the second floor, on each packaging line. From the intake side of each collector, a pipe runs to the area surrounding its respective packaging line. Fitted with a shutoff valve, it is this pipe to which the flexible hoses for picking up the beans are attached.

Canvas bags protect exhauster. Internally, each collector consists of six tubular canvas bags which prevent dust from getting into the exhauster. The dust clings to the sides of the bags. Periodically, these bags are cleaned by shaking.

Each collector is located a short distance to the side of the hopper which feeds the elevator leading to the bean cleaner and stoner. The purpose of this is to simplify the flow of beans from the collector to the elevator hopper.

In actual operation, any spilled beans are picked up with the flexible hose and exhausted to the collector, inside of which they settle to the bottom. As required, the operator handling the cleaners on the second floor empties the beans from the collector into the elevator hopper. The elevator carries the beans to the cleaner and stoner. Passing through this equipment, the beans drop into the hopper feeding the packaging machines. One might consider the entire operation as a continuous recirculation system for product spilled.

Require only two hoses. Although we have only one exhauster, the system is designed so that two hoses, one on each of two different packaging lines, can be operated simultaneously, with the beans from one line being carried to its respective collector on the floor above. For our operation, we have found that two hoses are adequate to keep all of our lines clean continuously.

Advantages

The advantages we have gained from the use of this vacuum "pick-up" system are:

1. It eliminates carrying 100-lb. bags of beans from the packaging room floor to the floor above, and from the basement two flights up. We have closed up the hoppers under each packaging machine, thereby making one less piece of equipment on each line to keep free of beans.

2. Tagging these bags with the variety name — a time-consuming job — is no longer necessary.

3. It eliminates the use of the blower previously used to pick up spilled product and, consequently, the excessive dust which was stirred up by the blowing. Now it is easy to keep the packaging line free of dust.

4. It gives us positive assurance of not getting varieties mixed — an important advantage! Imagine the impossible task of separating even a handful of one variety of bean from thousands of another variety.

5. It saves an average of 20 man-hr. per 8-hr. shift — the labor required to bag the spilled beans, tag the bags, and carry them upstairs.

6. It reduces cleanup time during changeovers from one variety to another. With the vacuum system, the operator cleans up the line periodically throughout a run of a single variety. When changeover time comes, the area is practically clear of beans, and it is a matter of minutes to switch to a different variety.

7. It provides an all-around cleaner operation since the beans are picked up immediately after being spilled. *(End)*

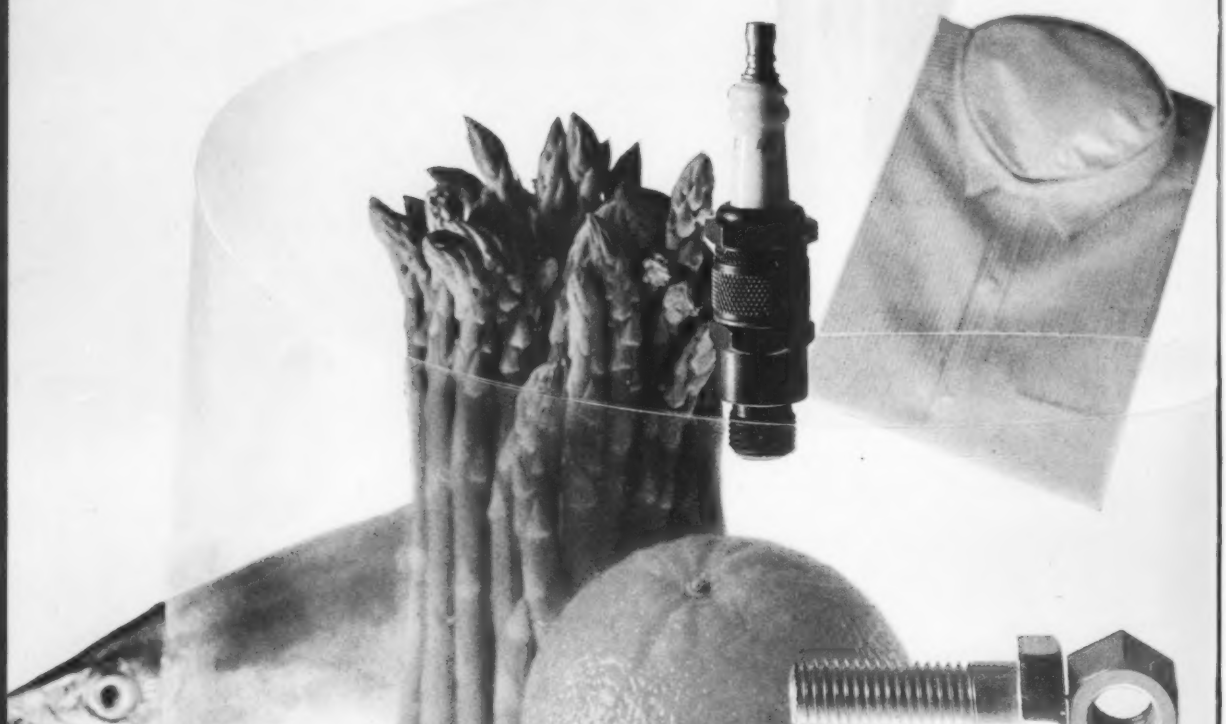
SPILLED BEANS are picked up by flexible hose of vacuum pickup system which has resulted in important advantages — cleaner operation, no chances of getting varieties mixed, saves man hours.

Packages for Performance

DOBECKMUN maintains the largest inventory of creative packaging ideas in the United States. Leader in polyethylene for packaging, Dobeckmun has refined this most versatile film into a durable, low-cost packaging medium of plate glass clarity and printability. Learn how Dobeckmun *packaging power* can generate increased sales for you by displaying your product to its best advantage. Call the Dobeckmun representative nearest you.

The Mock Seed Company markets wild bird seed in Dobeckmun polyethylene packages. Says Mock, "In snowy, wintery weather, this package holds the same appeal for customers as the contents do for our feathered friends."

DOBECKMUN



Polyethylene: Hardware, soft goods and foodstuffs—all this vast variety of products are favored with the eye-catching protective qualities of Dobeckmun polyethylene packaging. Make light work of loading and fast work of moving goods with heat-sealing, non-blocking polyethylene of superior transparency, engineered for Dobeckmun packages for performance.

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Announcements of machinery and products

1. Beneath each announcement is a code number. As you select items on which you want more information, *note* this number.
2. Now, *circle* the corresponding numbers on the postcard, page 79.
3. Next, *fill* in your name and address.
4. Then, *mail* the card – we pay the postage.

Stapling Machine

Container Stapling Corp. announces its Model C-P — sets up bottoms of empty cartons and

drives "King-Size Clips" at rate of 200/min. This single-acting power device with only one moving part uses a diaphragm chamber which requires no lubrication. Unlike an air cylinder, the piston is never in contact with the walls. The controlled valve can operate at 30,000 cycle/hr. Model C-P is portable and connects to any ordinary air line supplying 60 to 80 lb./sq. in. Circle No. 1.

Bag Closure System

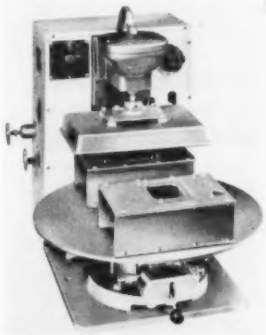
Chase Bag Co. has a method (tape-over-sewn closure using special tape, adhesive and method of application) of closing both ends of multiwall bags for protection against moisture. Bottom closure is made when bag is manufactured, and same type of closure is applied to top at user's plant with special closure unit which adapts to any existing conveyor or bag filling equipment. As bag moves on equipment, it (1) trips existing switch, starts sewing machine, "Chasetite" unit and pressure rolls. (2) Adhesive is applied to tape just before folder, and tape is fed through by pressure rolls. As front edge of bag passes rolls, it (3) trips cutter which trims excess lead tape. Trailing edge actuates cutter again to cut tape at trailing end. Bag (4) trips contact as it leaves cutter and thereby shuts down sewing machine, unit and pressure rolls. Closure unit seals from tape end to tape end, sealing the ends extending beyond surface of bag. Application speed is such that heat will not scorch paper or melt a poly-coated inner sheet. Circle No. 2.

High-Speed Checkweigher

Illumitronic Engineering reports its Model #525 checkweigher featuring continuous motion weighing and rejecting. Speeds up to 275 units/min. are possible with consistent accuracy of 1/25 oz. Machine requires no changeover for different package sizes and has over- and under-weight separation and simple serve unit accessory. Circle No. 3.

Bench-Size Bubble Packager

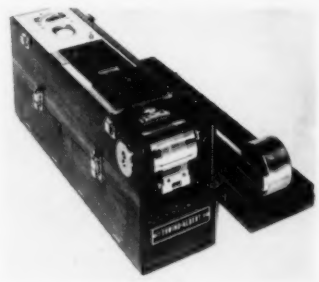
Erdco Engineering Corp. has developed a bench-size plastic bubble packaging machine for fast



production of short-run packaging jobs, called "Clear-Pak Junior." Sealing is effected by resistance heating. Machine features speed — seal every 3 sec.—and quick changeover— less than 10 min. from one size item to another. Complete in itself, unit includes air-pressure regulator, power drive, controls and timer. "Clear-Pak Junior" handles packages up to 7x9 in., takes up an 18x25-in. area and is 21 in. high. Circle No. 4.

Adhesive Tensile Tester

Thwing-Albert Instrument Co. has developed the "Thwing-Albert T-A-C Tester" designed to test ad-



hesive bond strength. Instrument contains cylinder wrapped with one adherent and flexible belt to which other adherend is attached. Adhesive is applied to one adherend; then belt is wrapped around cylinder. After controlled interval, belt is released and drum rotates. Force of adhesive bond is transmitted from cylinder to gage (which measure tension and compression forces up to 20 lb.) and can be read immediately on gage dial. Dial indicator holds maximum reading even after force is removed to show shear strength at failure in lb./sq. in. Controls permit adjustment of variables as, pressure against adherends, open and closed times, and adhesive film thickness. Circle No. 5.

Plastic Vial Unscrambler

U. S. Engineering Co. announces an unscrambler—a modification of its standard elevator hopper with about 10-cu. ft. capacity—for polyethylene and plastic vials which unscrambles and sets vials onto moving conveyor at rate of 120 or more vials/min. Inclined, cleated conveyor picks up and partially orients the product, depositing it onto a four track orienting and discharge system. Excess vials are rejected by rubber knock-off wheel back into hopper. An escapement releases one part at a time from each track into orienting wheel. Properly oriented

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Here's an "economy move" you may have overlooked! By shipping high-finish, precision assemblies in paper bags you lower freight costs. You save packaging time. You reduce damage claims—build customer goodwill.

Each custom-made bag illustrated, packs a reveal moulding used in automobile assembly. Bags are waxed kraft, moisture-proof. They seal out dust—completely safeguard polished surfaces from scratching in transit and storage.

Versatile lightweight paper bags are proving the least expensive, most effective packaging for thousands of different products today. How much could they save you? Write for free booklet CP-1.

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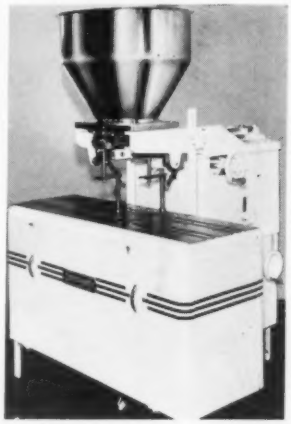
parts are allowed to pass through the wheel and into storage tub ready to be transferred onto conveyor belt. Improperly oriented parts are detected in orienting wheel, indexed 180°, and discharged, properly oriented, down tube. Machine will discharge four vials at a time. Circle No. 6.

Viscous/Semiviscous Filler

Arthur Colton Co. announces the availability of its Model 15RF-2, a two-line production machine



for filling cans, bottles, jars or paper cups with semiviscous and viscous materials. Featuring an adjustable filling head assembly controlled by handwheel to facilitate set-ups for containers of different heights, machine is equipped with rising table for bottom-up fill. Features include feed bar-type conveyor with removable bars for container movement; new diagonal filling position of containers; no-container, no-fill device. A micrometer-type quantity adjustment permits accurate material feed settings—fill accuracy, (±) ½ of 1 per cent by volume. It has filling range of ¼ oz. to 1 qt., and vertical container height range within a 6-in. total variation. Production rate is 20 to 60 fills/min. and its stainless steel hopper has 80-qt. capacity. Circle No. 7.

Container And Package Tester

Testing Machines, Inc. reports the development of Model TM49-005 which performs compression, stacking and manufacturers joint tests on specimens up to 36x48x 72 in. Available features are variable speed drive, audible deflection signals and constant load arrangement to duplicate warehouse stacking force. It has strength ranges of 0 to 2,000 and 0 to 10,000 lb. and is accurate to ½ of 1 per cent of full scale

reading. Operating on precision dead-weight weighing system, machine is equipped with eye-level dial and deflection indicator and recorder. Circle No. 8.

Automatic Case Packer

W. F. and John Barnes Co. has a new automatic case packer that lifts bottles into cases. Basic machine consists of infeed lane conveyor, pattern-collecting station, case-loading station, carton discharge mechanism—also a line divider for particular requirements to receive double or single lane of bottles, jars, jugs or cans. Case packer receives bottles, forms and collects pattern, lifts bottles into case, inserts cardboard, closes inner flap, glues outer flap and closes flaps prior to discharge. Bottom loading eliminates hydrodynamic shock. Caser runs completely unattended and operates on demand principle, loading cases as fast as filling line supplies container. Handles many shapes, from half pints to gallons. Circle No. 9.

Bag Flattener

New London Engineering Co. introduces its Model BB12Ex8′ Type 32 for flattening bags as they

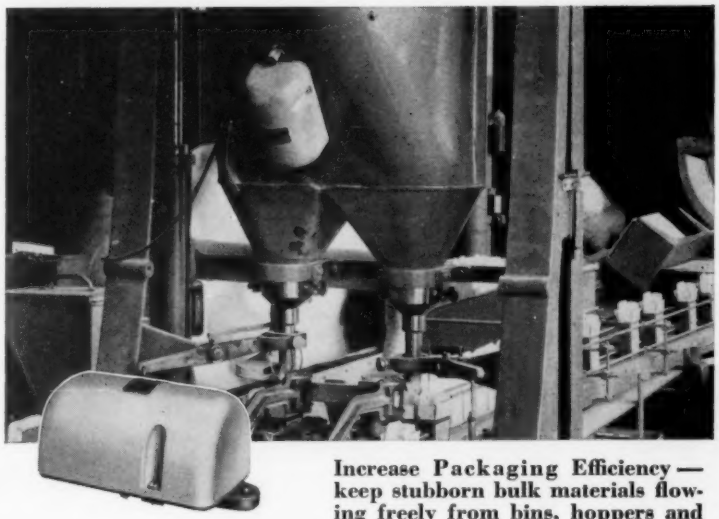
come from filling machines, for stacking or palletizing. This 8-ft. unit is basically a "New London Cost-Cutter Conveyor" with inverted power feeder driven from snub pulley shaft. The upper belt (available in widths from 8 to 24 in.) can be adjusted to desired minimum position above the lower belt, and several bag sizes can be flattened without changing adjustment. Amount of compression required is achieved by adding weight to shelf on upper belt. Circle No. 10.

Shock Recorder

Research, Inc. has developed "Dyna-Count," an instrument for recording mechanical shocks of shipping containers. It counts number of shocks which equal or exceed factory preset G-level and is responsive only to accelerations perpendicular to its mounting surface. Self-contained and self-energized, its digital counter has storage capacity of 999 counts. Measuring $2\frac{13}{16}$x$1\frac{3}{8}$x$1\frac{3}{16}$ in., unit can be mounted on flat surface

SYNTRON *Pulsating Magnet*

BIN VIBRATORS



Increase Packaging Efficiency — keep stubborn bulk materials flowing freely from bins, hoppers and chutes

SYNTRON Bin Vibrators assure a constant flow of bulk materials from storage and supply bins and hoppers to packaging lines—eliminate damage from pounding and poking.

Their 3600 powerful vibrations per minute will overcome the arching, bridging or rat-holing of the most stubborn materials.

Adjustable vibration—to suit conditions and material characteristics.

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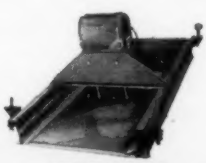
PACKER AND JOLTERS

HOPPER LEVEL SWITCHES

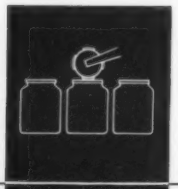
FLOW CONTROL VALVES



VIBRATING SCREENS

SPIRAL ELEVATOR FEEDERS

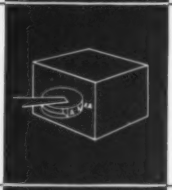
MARKING EQUIPMENT
for products and packages



RUBBER TYPE FOR CAP CODING

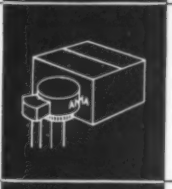
Curved to fit your coding wheels. Made in individual characters and one piece logos.

Logos save set-up time, easy to clean and store.



CONTAINER CODER

Coding type for printing outside edge of moving filled containers. Usually installed on case sealing equipment.



SIDE PRINTER

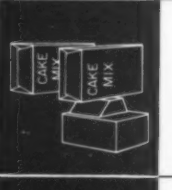
Prints display information on sides of moving containers. "Snap-in" dies can be changed with no tools in four or five seconds.

TAPE CODER

Print sealing tape prior to sewing operation. Friction driven by moving tape. Two impressions, one on each side of bag.

BOX FLAP CODER

Non-inked impression on inside flap of corrugated container. Indented mark cannot be obliterated.



HOT BRANDER

Produces a "scorch" mark on container having large amounts of printed matter. Heated type gently marks delicate surfaces.

PERFORATING CODER

Waxed paper and outer wrap perforator. Interchangeable steel type is easy to change, practically indestructible.

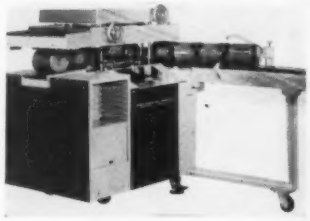
Write Today—Stating Your Marking Requirements

JAS. H. MATTHEWS & CO.
3962 Forbes Ave. • Pittsburgh 13, Pa.
Offices in Principal Cities

or hidden in shipping containers used for tests. A bank of "Dyna-Counts," each adjusted for different G-level, can be used to determine relative prevalence of certain loads within range of interest. Circle No. 11.

Can Imprinter

Charles Beck Machine Corp. announces its new can imprinter that prints color name, formula,



batch number or other data to register on lithographed cans in one operation. Machine handles double chime cans, containers made of metal, plastic or fibre, either filled or empty. Two settings are required to change can size from ¼ pt. to 1 gal. (with or without ears). Individual-type or 8x11-in. plate can be changed in minutes. Machine requires 4x8-ft. floor space. Circle No. 12.

General Purpose Adhesive

Schwartz Chemical Co., Inc. announces its "Rex-N-Glue," a clear vinyl base adhesive with high solids content for cementing dissimilar plastics, and plastics to nonplastics. It forms a noncrystalizing, permanent, flexible bond and can be used as wet bonding agent, contact cement or by reactivation technique. Circle No. 13.

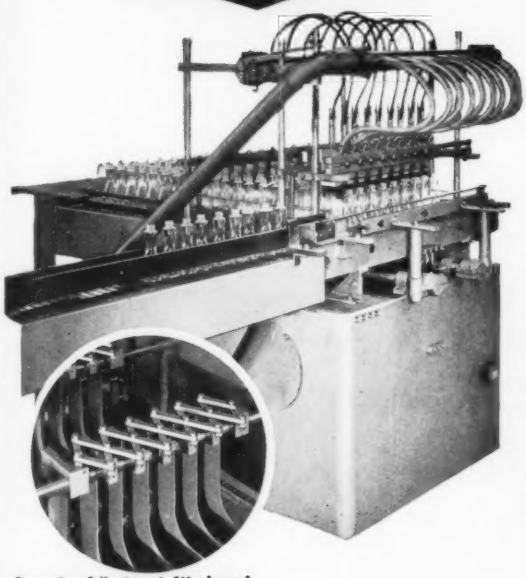
Bin Vibrators

Eriez Manufacturing Co. has added a heavier unit to its bin vibrator "Hi-Vi" line. Available in two models, V3A-50P is "impact" type with vibratory output, is in form of steel on steel, while V3A-50S is "seminoiseless" having one semiresilient impact element for cushioned impact. For use on bin walls of ¼-in. maximum thickness with 50-cu.-ft. capacity, their impact prevents clogging, sticking and bridging in larger, heavier bins than those serviced by other V3A models. The action simulates blows of hammer, providing motion at point where material is sticking or clogging. Circle No. 14.

Removable Adhesive

Adhesive Products Corp. reports the development of "Kleen-Grip," a new type adhesive for adhering

DOUBLE DUTY: CLEANS & FEEDS!



Separator Adjustment Attachment

Double Savings

- Simplified construction
- Less floor space
- Accurate synchronization
- Quick change attachments

Fewer moving parts and fewer operations to blow out bottles make this M-S machine a model of simplicity. One operator supervises two operations.

QUICK CHANGE ATTACHMENTS
The new Separator Adjustment Attachment and Cleaning Head Adjustment Attachment permit complete changeover in less than 5 minutes.

- Easily attached to your present machine, or new units
- Quick, positive setting
- Adjustments readily made by operator. No tools required
- Give added efficiency to your production

write or wire for full information

MS MACHINERY SERVICE COMPANY
214 Eiler Avenue, Louisville 14, Kentucky
OFFICES IN PRINCIPAL CITIES

Circle No. 245 on Card, Page 79

Need a tissue you can *heat seal?*

Here's a tissue specially treated to seal itself under heat and pressure. Applications? Autoclaving . . . pouch packages (it's strong and readily adaptable to high speed automatic pouch packaging machinery) . . . many more. Crystal develops tissues of every type that can be twisted and woven —laminated to films and foils—impregnated —you name it. Send the coupon to get technical information.

First name in tissues for over 60 years

Crystal®

The Crystal Tissue Company, Middletown, Ohio
I want samples and more information on Crystal Tissues for special applications. PE 959

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Circle No. 246 on Card, Page 79

THE MAN WITH THE ★ MULTIWALL PLAN

UNION
PACKAGING SPECIALIST
"WHITEY" CAMPBELL

shows packer how to pocket $85,000

$85,000! That's the *annual* dollar savings one user of Multiwall bags will enjoy as a result of a recent Union packaging survey.

The survey, made by Union Packaging Specialist "Whitey" Campbell, showed that: (1) $57,000 a year could be saved simply by switching the company's 3-ply domestic baler bags to 2-ply's. (2) reinforced sewing construction on 100-lb. packages would save 20# basis weight per bag . . . and additional thousands of dollars in costs depending on the number of bags used.

Union Multiwall Recommendations are based on this 5-Star Packaging Efficiency Plan

- DESIGN
- EQUIPMENT
- CONSTRUCTION
- SPECIFICATION CONTROL
- PLANT SURVEY

These were the major recommendations made and put into effect through Union's 5-Star Packaging Efficiency Plan. Total savings are expected to amount to more than $85,000 when all improvements are completed. How much could this plan save you?

Better Multiwall performance through better planning

union camp ★

UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

UNION MULTIWALL BAGS

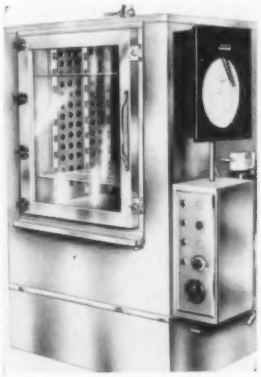
UNION BAG-CAMP PAPER CORPORATION
233 BROADWAY, NEW YORK 7, N. Y.

For more information circle No. 247 on Reader Service Card, Page 79

labels to plastic, metal and other surfaces. It stays on polyethylene, polystyrene, acetate, steel, but can be removed by peeling off label, stripping adhesive at same time. Waterproof and flexible, "Kleen-Grip" can be applied to existing labels by brush or automatic machine. Circle No. 15.

Temperature/Humidity Chamber

Electric Hotpack Co., Inc. announces the development of a controlled temperature and humidity chamber equipped for package testing. Designed with temperature and humidity ranges from 0° to 100°C., and 20 to 98 per cent relative humidity, chamber provides shelf-life, water-vapor penetration and other package tests. Full-view door window allows continuous observation of test article. Indicating-controlling temperature and humidity recorder assures uniform temperatures and humidities throughout chamber, says the manufacturer. Refrigeration and humidity systems are integral part of cabinet, and interiors are non-corrosive stainless steel. Independently circuited over-temperature controller automatically breaks electrical heater circuit in event of controller maladjustment or malfunction. Circle No. 16.



Clear Plastic Containers

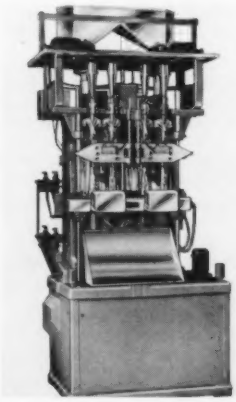
Celluplastic Corp. announces the availability of a new 2½-in. diameter outer container of thin wall, flexible extruded plastic that is crystal clear, will not crack or tear, has no seams and a reinforced bottom. Containers come in any length desired and can be multicolor printed. Circle No. 17.

Squirt Cap

Continental Can Co. reports a plastic squirt cap for controlled dispensing of liquid products in thin stream for its pint-size, F-style cans. A combination plastic nozzle and captive cap, the user clinches nozzle portion of cap, after filling, with equipment available from packaging machinery manufacturers. Cap is suitable for products which can utilize controlled dispensing to advantage. Circle No. 18.

Form-Fill-Seal Machine

Food Machinery and Chemical Corp's Packaging Machinery Div., Stokes and Smith Plant, has developed a new model "Stokes-wrap," which, FMC says, combines high speed packaging in a minimum floorspace. Incorporating four filling tubes in a single unit, it produces "four-seal" or "pillow" type packages from printed or unprinted roll stock of heat sealable materials and laminations at rates up to 200 or more packages/min. Electric-eye system provides separate registration for each web. Machine has automatic volumetric, counting or liquid feeds. Circle No. 19.

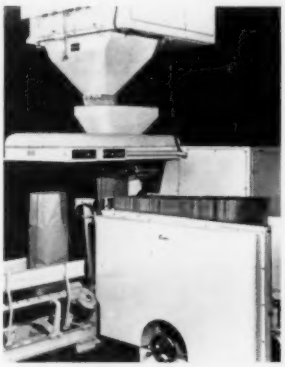


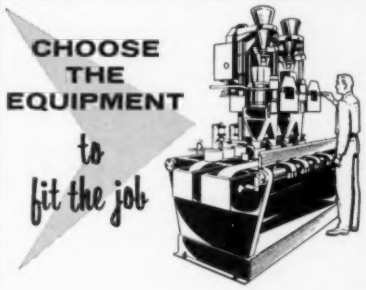
Aluminum Bottle Carrier

Reynolds Metals Co. offers an aluminum bottle carrier named the Reynolds aluminum carton. Made of 0.025-in. ribbed aluminum with a heavy gauge wire handle that slides up and down for easy carrying or stacking, carton is available in 6- and 12-bottle models, and is washable. Carrier's sturdiness permits use of less expensive case and its strength and rigidity help reduce bottle breakage, Reynolds says. Circle No. 20.

Multiwall Bag Feeder

Bemis Bro. Bag Co. reports the development of "Auto-Mac," its automatic open-mouth multiwall bag feeder. Bag is fed to bagholder which receives discharge of product from overhead scale, eliminating manual placement of bag on scale bagholder or spout. As product is discharged, "Auto-Mac" automatically delivers filled bag for closing. Unit has two steel arms containing vacuum cups—one moves forward to magazine and draws out bag from vertical stack; second moves behind bag and opens it. Two vertical bars with air-operated clamps grasp opened bag and lift it on bagholder, which holds bag to spout during filling. Equipped with easy-loading magazine, unit has switch to activate cycling operation and individual controls to regulate speed. Operates at 16 bags/min. Circle No. 21. *(End)*





Illustrated is the Bar-Nun Can Line for feeding, filling, packing and ejecting cans, jars or cartons. Gump Equipment also includes net weighers for manual lines, and automatic bag packaging equipment. Packagers of dry powdered, granular or crystalline materials can stop costly overweights and save on packaging labor with the right model of this highly accurate and dependable equipment. Write for recommendations on your packaging requirements. Tell us the material, weight, container, capacity desired.

B. F. GUMP CO.
1346 S. Cicero Ave., Chicago 50, Ill.

Circle No. 248 on Card, Page 79

Industry literature available free

1. Beneath each announcement is a code number. As you select items on which you want more information, *note* this number.
2. Now, *circle* the corresponding numbers on the postcard, opposite this page.
3. Next, *fill* in your name and address.
4. Then, *mail* the card — we pay the postage.

Automatic Case Imprinter

J. L. Ferguson Co. has available an engineering data sheet report on its complete line of Packomatic automatic case imprinters. Dimensions and photos of the imprinters, capable of imprinting from 1 to 4 vertical panels of corrugated cases at various speeds, are also included. Circle No. **101.**

Plastic Deflection Tester

American Instrument Co. offers bulletin No. 2307 describing its "Aminco Plastic Deflection Tester," that indicates the deflection of thermoplastics when subjected to various loads and temperatures in accordance with ASTM Test D648-56. Four samples can be tested simultaneously by placing each in specimen holder and lowering holders into insulated bath. Deflections are indicated on dials mounted on holders. Circle No. **102.**

Bulk Container

Sealrite Co., Oswego Falls Corp. Div. is offering an illustrated, spiral-bound case history type report describing its "Sealkan," a paper cylinder with metal top and bottom and plastic coated interior. The booklet pictorially follows the packaging of frozen eggs, showing the assembling, filling and freezing operations. Several ways of stripping Sealkans for customer use are shown. Circle No. **103.**

Narrow-Slit Tapes

W. H. Brady Co. offers Bulletin No. 522 telling how its pressure sensitive tapes, in roll form, can be slit as narrow as 1/64 in. with a tolerance of (±)0.005 in. Colors, tolerances, minimum widths, and recommended uses for various tapes are included in the bulletin. Plastics, (including vinyl, Mylar, acetate), aluminum foil, paper, glass, and cotton cloth are among the materials that can be furnished in pressure sensitive roll tape form. Circle No. **104.**

Rubberized Hair

Janesville Cotton Mills offers information on "Hair-Kore," a cushioning material made of rubberized curled hair. Designed to protect against shock, it is molded to fit and cushion each piece of equipment with, according to the manufacturer, a saving in weight and volume. Circle No. **105.**

Meat Wrapping

American Viscose Corp.'s film division has available a 38-page "Meat wrapping handbook." It gives information on cellophanes used, answers to questions that most often arise on meat wrapping, and cost and source data on meat wrapping materials and supplies. Photographs showing the best way to use cellophane and suggestions for applying thermoplastic labels are included. Circle No. **106.**

Corrugated Boxes

Hoerner Boxes, Inc. has a brochure, "Meet the Hoerner team of specialists who build better corrugated boxes for you," which gives a picture story of the step-by-step procedure of analyzing, designing and constructing corrugated shipping containers. Circle No. **107.**

Corrugated Containers Machine

Colt Packaging Machinery Co. has an 8-page brochure citing advantages of making corrugated packing and shipping containers in the user's plant. Colt says its "Rite-Size Box Machine" is designed for the packaging user who needs varying sizes and quantities of containers to meet daily packaging and shipping needs. Dimensional change requires about 1½ min. Circle No. **108.**

Stock Bottle Catalog

W. Braun Co. has a 104-page catalog illustrating and giving dimensions for range of styles and sizes of stock mold glass and plastic bottles, ranging from ½-dram to 5-gal. capacity. Ceramic decorating and various types of closures are also discussed. Circle No. **109.**

Packaging Nonuniform Products

Hayssen Manufacturing Co. has a brochure on its "RT" machine that produces packages from heat sealing materials for hard-to-package and nonuniform products without cards or other support. Products of various lengths and shapes can be run on machine without changing parts. Circle No. **110.**

Polyethylene Packaging

Amsco Packaging Machinery, Inc. has available a 6-page illustrated brochure outlining its assembly line technique for sealing products in polyethylene packages. Method meets production requirements ranging from 10 to 100 pkgs./min. Circle No. **111.**

Carton Sealer

Container Corp. of America has available a brochure on its "Concora" sealer. Machine uses high frequency radio waves as catalyst for activation of cold polyvinyl adhesive, applied directly to waxed carton surfaces. As carton passes between the electrode sections of sealer, a selective heating effect is produced in the adhesive between the carton's end flaps. Package contents are unheated, but paraffin is melted allowing deep penetration of glue into fibers. Circle No. **112.**

Protective Packaging

Cromwell Paper Co. offers a 24-page illustrated booklet titled "Paper Engineering." Describing the company's range of operations as impregnator, laminator, reinforcer and embosser, the booklet suggests answers to various protective packaging problems. Described are papers specially designed to prevent copper tarnishing, ferrous corrosion, to protect against water vapor, acid, mold, abrasion and other dangers. Circle No. **113.**

Tarnish Inhibitor Paper

Daubert Chemical Co. offers a brochure on its "Nox-Tarnish," an impregnated packaging paper designed to prevent tarnish on silver, cadmium, copper, brass and gold alloys. Acting selectively on sulfide fumes in the atmosphere, the paper can be fabricated into envelopes, bags and liners. Laboratory test to determine the effectiveness of paper is included. Circle No. **114.**

Silicone Coated Papers

Ludlow Papers, Inc. offers samples and a brochure on its silicone coated papers. Using Dow Corning coatings (described as noncontaminating, nonmigrating, lightweight and permanent), the papers are anti-adhesive and water repellent. Silicone coatings are available on kraft, glassine, parchment, bags, boxes, drums, boards, unit containers, cores, liners and interleaving. Circle No. **115.**

Plastic Containers

Gibbs Automatic Moulding Corp. offers brochures picturing uses and advantages of polystyrene food containers designed for salads, cottage cheese, sherbet, jellies, ice cream, candies and similar products. Container tops are of polyethylene, suitable for imprinting in one to three colors. Circle No. **116.**

Bag Packers

B. F. Gump Co. has a 4-page brochure picturing and describing its line of "Vibrox" bag packers. Mechanical action packers that impart a rapid vibrating or settling motion to cotton, burlap or paper bags as they are filled, the "Vibrox" will compact dry bulk materials into smaller bags with a minimum of labor, says the manufacturer. Circle No. **117.**

Carton Sealing Tape

Shuford Mills, Inc. has a data sheet listing the physical characteristics and applications for its "Shurtape RP-25." A heavy-duty, self-sticking

plications for each type of resin. Circle No. **134.**

Carton Set-Up Machine

Bivans Corp. offers a 4-page bulletin describing its Model 50 automatic carton set-up machine. Unit is portable and produces up to 4,000 cartons/hr. Sizes handled range from ⅜x⅞x1¼ in. to 3½x5x12 in., with 20 min. allowed for change-over. Circle No. **135.**

Straight-Line Labeler

Economic Machinery Co. offers a bulletin, CM-264, which lists detailed specifications for its straight-line labeler. Equipped with a no-bottle, no label control, this machine can apply one, two or more labels on any glass container within speed range of 70 to 240/min. Circle No. **136.**

Accumulator And Bundler

Hayssen Manufacturing Co. has an illustrated bulletin telling how savings can be effected by bundling unit packages together in film or paper wraps, eliminating the need for intermediate cartons or bags. Labeling and imprinting units are available for use with this equipment. Circle No. **137.**

Aluminum Closures

Aluminum Co. of America, Closures Div., has a 30-page brochure describing and picturing various aluminum cap styles. Also included in the booklet are illustrations and specifications for a number of "Alseco" sealing machines, which accommodate bottles ranging in height from 1 to 18 in. Circle No. **138.**

(Turn page)

Completely Automatic

BAG CLOSING OPERATION!

SAVE A SALARY EVERY WEEK WITH THE New FRY "TOMMY TUCKER"

■ Here is the answer to the great demand for a **fully automatic** bag closing line, the FRY Tommy Tucker Machine! Not only does it eliminate two steps formerly requiring the services of an operator, but also has proven itself **100% trouble-free** under strenuous production conditions! Plus—now you can speed up production— up to 50 bags per minute—and yet produce neater, uniform appearing packages. Designed to operate between Fry Closing Machines and V-30 Vibrator, the Tommy Tucker will, **1**—tuck the bag ends and, **2**—flatten the bag top for proper feeding into the CBG machine. No synchronization necessary—no bag jamming possible and **no operator** needed!

WRITE FOR NEW, INFORMATIVE LITERATURE ON ALL FRY MODELS. PLEASE ENCLOSE SAMPLE OF PRODUCT & BAG.

GEORGE H. FRY COMPANY

42 East Second Street, Mineola, N. Y. — Ploneer 6-6230

For more information circle No. 249 on Reader Service Card, Page 79

The SEALTITE SYNCHROMATIC

Produces a BETTER PACKAGE from a Standard Paper Bag at Big Savings

Write for Complete Information

CONSOLIDATED PACKAGING MACHINERY CORP.

BUFFALO 13, N.Y.

. . and here is how and why you can make such tremendous savings with it!

MATERIAL SAVINGS
TAPE SAVINGS OVER 98%; GLUE COSTS LESS THAN 2% OF SEALING COST. EXAMPLE: PLANTS WITH OUTPUT OF 2,400 AVERAGE SIZE BALES PER 8 HOUR DAY CAN . . . .
SAVE EACH DAY IN MATERIAL ALONE $18.00 OR ANNUAL SAVINGS OF $5,616.00

LABOR SAVING
100% OR MORE OVER HAND-SEALING METHODS. WHERE NORMAL 2 TO 4 MAN CREW IS USED, 1 MAN. OPERATION IS CUT TO 1 MAN.
AVERAGE MINIMUM ANNUAL LABOR SAVINGS $5,200.00

MINIMUM SAVINGS (COMPUTED ON 2,400 BALES IN AN 8 HOUR DAY WEEK) AMOUNT TO $10,816.00 PER YEAR

Tol-O-Matic, Inc. 246 Tenth Avenue So. Minneapolis 15, Minn.

THIS IS THE Tol-O-Matic AUTOMATIC BALE SEALER

How To Save 100% OR MORE On Sealing BALER BAGS

Distributors' Inquiries Invited . . .

Facts About Pliofilm

The Goodyear Tire & Rubber Co. Packaging Films Dept. offers an illustrated brochure giving a nontechnical description of Pliofilm; it is entitled "Facts you should know about Pliofilm." It discusses methods of ordering, handling, printing, and so on. Yield and physical data charts are included as well as an end-use chart which lists suggestions on specifying the proper grade and weight Pliofilm for a specific packaging application. Circle No. **139.**

Molded Pulp Packaging

Keyes Fibre Co. offers a 4-page brochure listing the advantages of molded pulp shapes for interior packaging. Custom molded into varying shapes, this material provides contoured partitions that protect against shock, and are particularly adapted to the low cost packaging of fragile products such as fruits, glassware, electrical parts, fluorescent tubes, meters, and so on. Circle No. **140.**

Tablet Counter

The Lakso Co., Inc. has an information sheet describing its "48 Tablet Counter." This machine counts and fills from 45 to 100 bottles of 100's/min. Adjustable for tablet thickness, unit is furnished on portable table and uses floor space measuring 27x42 in. Circle No. **141.**

Bottle Fillers And Cleaners

The Karl Kiefer Machine Co. offers an illustrated brochure describing its line of vacuum and pressure filling machines, bottle air cleaners, and rinsers. Handling a wide variety of container sizes and filling liquid and viscous products, 12 models of these machines are described. Circle No. **142.**

Container Stapler

International Staple and Machine Co.'s Brochure No. 100 describes its hand boxer for stapling filled containers from the outside. It will staple top and bottom of container in 20 secs. Circle No. **143.**

Cushioned Shipping Bags

Jiffy Manufacturing Co. offers samples and descriptive material on its line of padded shipping bags. Bags available include a padded shipping bag made with mesh reinforced outer liner, heavy-duty shipping bag with outer liner of slick 90-lb. Beaming kraft, and utility shipping bag, unpadded, constructed of 100-lb. stock. Circle No. **144.**

Marking Machines

Industrial Marking Equipment Co., Inc. has a catalog covering its line of marking, dating, and coding machines. This illustrated catalog gives technical data on the "Whippet Marker," "#7 Autoprinter," "Rainbow" Coder," other standard units. It outlines base lock types and logos, as well as showing custom-designed marking machines for special application. Circle No. **145.**

Gravity Fillers

Horix Manufacturing Co. has a booklet, "Canning for profit," which illustrates installations of automatic rotary gravity fillers with their specifications. Models feature no-

The AVION WEIGH means RELIABILITY no tubes • rugged SIMPLE compact • easy to install ECONOMICAL low maintenance plus HIGH SPEED ACCURACY

AVION acf AVION DIVISION
acf INDUSTRIES INCORPORATED
9 Park Place, Paramus, N.J.

Circle No. 252 on Card, Page 79

WHIZ-PACKER

VOLUMETRIC FILLERS

Both bench and floor models for filling all types of containers with amounts from several grains up to 5 lbs. with dry products.

- Speeds up to 60 fillings per minute.
- Quick product changeover.
- Contact parts removable for thorough cleaning.
- Agitation to suit product.
- Most economical filling method.

Write for complete details

FRAZIER & SON
20-01 INDUSTRIAL WEST, ALLWOOD
CLIFTON, NEW JERSEY
Designers and manufacturers of • Volumetric and Net Weighing Machines • Parts Handling Equipment • Rotary Filling Machines • Conveying & Elevating Equipment

Circle No. 251 on Card, Page 79

Circle No. 253 on Card, Page 79

container, no-fill device and have from 6 to 48 valves. This machine will fill hot or cold foods without aeration, in cans, jars, bottles, or tumblers. Capacities range from 1 oz. to 5 gal. Circle No. **146.**

Urethane Foam Cushioning

Mobay Chemical Co. has a 20-page booklet reviewing the details of its urethane foams. Properties and performance features are illustrated and described, and range of applications included. Circle No. **147.**

Gummed Tape Tips

Gilman Paper Co. has two folders listing suggestions for getting best results from gummed and reinforced gummed sealing tape. Circle No. **148.**

Bag Closers

George H. Fry Co. has a 4-page illustrated folder that gives specifications and operating features of four different models of bag closing machines. These are continuous motion machines that close and seal paper bags up to 3-lb. capacity. It handles bags made of kraft paper, waxed paper, plain or waxed glassine, foil and paper combinations, using either adhesives or the heat-seal method. Circle No. **149.**

Case Feeder

Emhart Manufacturing Co.'s Portland Div. has an information sheet on its Model 840 case feeder. The bulletin describes the feeding, positioning, cushioning, and flexibility of the machine. Included are specifications and a line drawing of a Model 840 case feed floor plan. Circle No. **150.**

Seamless Metal Cans

George D. Ellis & Sons, Inc. offers Bulletin No. 116 covering details of its seamless metal cans. This bulletin illustrates the various cans, and includes tabulations of their fluid ounce capacities, diameters, body heights, packing per carton, and weight per gross. Circle No. **151.**

Industrial And Specialty Tissues

The Crystal Tissue Co. offers a fact file with sample swatches of basic tissue types which are available for industrial, converting, and specialty applications. The file outlines, describes, and illustrates the special characteristics of each type of tissue, explains how new tissues are developed for special requirements, and provides lists of examples of standard and unusual uses. The file is punched to fit a 3-hole notebook. Circle No. **152.**

Liquid Packeter

Brown Filling Machine Co., Inc. offers a 6-page brochure describing its "BFM Liquid Packeter." Handling liquids, this machine forms, fills, and heat seals in one operation, using films, foils, paper, and their laminates. Unit is said to produce up to 400 packets/min. and packet sizes range up to 4½x4¾ in. Circle No. **153.**

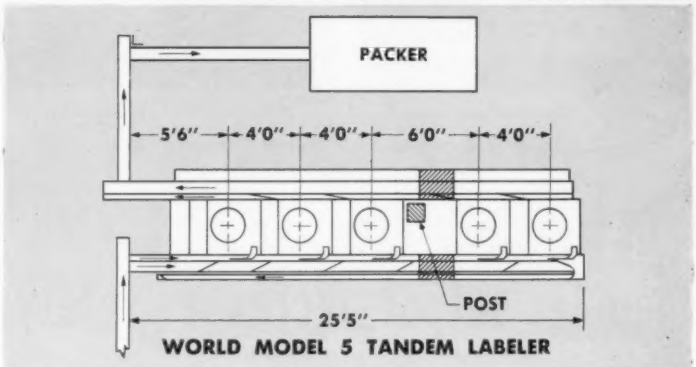
Collapsible Tube Reference

Wheeling Stamping Co. has a 6-page reference for selecting and specifying collapsible tubes, plastic closures ad specialties, and custom molded tips and caps. Brochure includes illustrations and stocksize table for general purpose closures.

Labeling Lines

by George L. N. Meyer, Jr.

LAYOUT PROBLEMS



WORLD MODEL 5 TANDEM LABELER

For some time now we have been giving technical information concerning glass labeling in these articles. In trying to be objective the information has applied to all labeling machinery manufacturers. In effect, the content material has been selected on the basis of its being applicable to the majority of labeling operations.

Now we'd like to discuss various *layout* problems which we have encountered in machine installations. As a result, this article deals with a problem which involved the World Tandem Labeler.

The problem centered around installing a World Model 5 Tandem Labeler in one of the leading breweries on the east coast, which had a supporting column in the area available for labeling equipment. As seen in the attached sketch there was one post squarely in the way of machine placement. The area allocated lacked sufficient room for movement of the machine operator, or access for maintenance and repair crews.

Our engineering department analyzed the problem and suggested the addition of a small section of conveyor to the infeed and discharge sides of the machine itself... thus spreading the distance between #3 and #4 units in order to put the post literally in the middle of our machine.

In so doing, we eliminated a built-in hazard that has always been a bothersome item for brewery personnel and we successfully completed a machinery sale as a result of our floor planning. Line efficiency has been increased as a further result and the customer is extremely pleased.

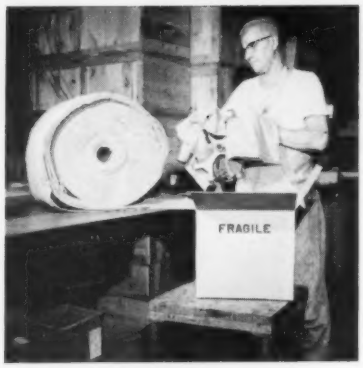
Admittedly, this was a simple problem. At the time we tried to solve it, however, it looked impossible and considerable thought was given to its solution.

Should you have a layout problem, whether it be a simple matter of a post, or some other contingency, we'd appreciate an opportunity to make a study and a recommendation. It may well be that you have a problem that cannot be solved, but we would certainly like to try – no obligation to yourself, of course.

World's Largest Manufacturer of high-speed Labeling Machinery

WORLD LABELERS

ECONOMIC MACHINERY COMPANY • Worcester 3, Mass. / Div. of Geo. J. Meyer Manufacturing Co.



A cleaner, faster operation resulted as International Equipment Co., Boston, switched from excelsior (left) to Cel-Fibe wadding (right) to wrap motors, parts, test tubes, and dynamically balanced instruments in its line of precision centrifuges for laboratory uses.

CEL-FIBE® protective packaging doubles output, increases safety

"Cel-Fibe cellulose wadding is the best packaging material we have ever used," says C. Clifford Hodge, production coordinator for International Equipment, leading supplier of laboratory centrifuges, citing these improvements:

Savings in time, labor. An operator packs double the amount—Cel-Fibe wrapping takes only half as long.

Savings in materials. With Cel-Fibe, one carton holds as much as was formerly packed in two cartons or a wooden case. Cel-Fibe ends the need for separators to partition tubes, fragile parts, and glassware.

Savings on storage. Wadding, paper, and other packaging materials are kept with space to spare in a room that had previously been set aside for storing a ton of excelsior.

Savings in shipping weight. Cel-Fibe permits use of fewer, lighter cartons.

Savings in maintenance. Apart from easier handling, non-shredding and non-powdering Cel-Fibe leaves no dust in the air or dirt on the floor, reduces clean-up time . . . also makes it easier, faster, and less messy for customers to unwrap orders.

Savings on returns. Low-sulfur and neutral-pH Cel-Fibe guards metals from corroding and surfaces from marring, avoids return of centrifuges bent or unbalanced in transit.

Your packaging problems can probably be lessened by learning how "success is certain with Cel-Fibe" in meeting military specifications and civilian requirements for cushioning and surface protection. Cel-Fibe is always available, when and as you need it. For more information—*write, wire, or phone:*

CEL-FIBE

Division of Personal Products Corp.

Milltown, N. J. • Milltown 8-0700

ONE OF THE Johnson & Johnson COMPANIES

collapsible tube caps, snap-on sifter and liquid dispensing fitments, and stock specialty items such as two-piece dispenser caps, polyethylene eye cups, polyethylene applicators, and triple-thread caps for dentifrice cans. Circle No. **154.**

Collapsible Metal Tubes

A. H. Wirz, Inc. has a manual devoted to proper selection and use of fold-up metal tubes. This 32-page handbook includes data on such specification factors as tube size, tube openings, tube closures, and tube liners. Selector charts serve as guides in determining the compatability of various products with such tube metals as aluminum, tin, lead, and special alloys. Circle No. **155.**

Net Weigher

U. S. Automatic Box Machinery Co., Inc. has an information sheet listing features of the "Scott" net weigher. It is available in four models that handle fills of 1 oz. to 5 lb., at speeds up to 40 weighings/min. Unit is adapted to free flowing and semi-free flowing dry products. Circle No. **156.**

Plastic Bottle Materials

Hercules Powder Co. has a brochure, "The plastic bottles come of age," which analyzes the relative advantages of high-density polyethylene and polypropylene plastic bottles compared with glass and metal containers. A point by point list of physical and chemical characteristics is given as well as a forecast of potential markets for these containers. Circle No. **157.**

Heavy-Duty Corrugated

Stone Container Corp. offers a 4-page illustrated folder and sample of its heavy-duty, humidity-resistant corrugating medium ("Stone-Cor") for shipping containers. Laboratory tests are reported, showing that 200-lb. test single wall corrugated box with special medium exceeds (by 33 to 77 per cent) stacking strength of 200-lb. test regular box. Chart shows advantage of 200-lb. special board over 275-lb. regular board. Circle No. **158.**

Cartoning And Overwrapping

F. B. Redington Co. has a 40-page catalog illustrating and describing 18 different types of standard cartoning equipment, as well as many special machines for tablet counting and filling, banding, envelope filling, and so on. Semiautomatic and fully automatic cartoners are listed with optional cellophane overwrapping machines. Complete packaging systems are available which set up cartons, load, and overwrap them. A wide range of products is packaged on these machines, including specialty foods, drugs, soaps, paper napkins, crackers, roll bandages, and film. Circle No. **159.**

Pallet Cover Materials

Kennedy Car Liner & Bag Co. offers sample sheets of paper and plastic materials used in fabricating pallet covers for protection against dust, dirt, moisture, water, and pilferage. Circle No. **160.**

Self-Sticking Tape

Permacel-Lepage's, Inc. has a 44-page manual of "Practical packaging ideas with Permacel tape." A description of each of 37 packaging

tapes is included, as well as illustrated applications of self-sticking tape for carton and box sealing, wrapping, bundling, bag sealing, canister and drum sealing, combining, palletizing, aperture sealing, and labeling. Circle No. **162.**

New Size Metal Container

Crown Cork & Seal Co., Inc. offers data on its intermediate sized can, a 2-base, 29-oz. juice can known as the "Crown 2-29." It is the same height as the conventional 46-oz. can and can be run through the same equipment. Circle No. **163.**

Packaging Films

Celanese Corp. of America has a folder containing information on its types of plastic films. Included are discussions of Fortiflex, a linear polyethylene available in bottles and jars, as well as in sheeting for formed packages of all types, including food containers; acetate film for window boxes, bags, wraps, tapes, and laminations; Fortiflex-A, a polyolefin plastic used in injection molded or blown bottles emulsions for container coatings; and containers; polyvinyl acetate and other materials. Circle No. **164.**

Overwrapping Film

Phillips Chemical Co. is offering samples of and data on Marlex polyethylene film. Film can be readily torn in a straight line with no tear tape. It can be boiled or frozen, is heat-sealable, and handles in "push through" overwrap machinery. Circle No. **165.**

Automatic Adhesive Control

Potdevin Machine Co. has published bulletin No. CS-255, that illustrates with a photograph the operation of the "Visco-Mat." This machine converts dry adhesives into a uniform liquid adhesive of correct viscosity and maintains that viscosity under constant control. It is said to be easily installed by connection to water and power supply. Circle No. **166.**

Bundling In Cellophane

Olin Mathieson Chemical Corp., Film Div., offers a bulletin which outlines the advantages of bundling multiple packages in cellophane. Suggested basic bundling arrangements are for different shaped packages such as tall, flat, round, and irregularly-shaped objects. An estimate work sheet that can be used to compare present costs with the cost of bundling is provided. Circle No. **167.**

Tubular Packaging

Niemand Bros. has issued an illustrated brochure describing its complete line of tubular paper packaging products. This brochure details its custom built and industrial packaging products, dispenser packages, goose-neck packaging, and similar units. Niemand says that its products can be designed and produced to a wide variety of specifications and requirements. Circle No. **168.**

Volumetric Filler

John R. Nalbach Engineering Co., Inc. has a data sheet with description of its rotary volumetric filling machines for free-flowing powders and granulated materials. These fillers handle a variety of sizes from 100 to 300 containers/min., and

It can't be just "adequate"...

PACKAGE MARKING

either makes money or wastes it

Readable, attractive marking made by Markem machines on your boxes or labels helps them from the moment they're marked to the time they're used — and can even help future sales as well. Good marking speeds handling . . . reduces waste and packing errors . . . allows quick selection by customers . . . simplifies and encourages reordering . . . carries the "quality" message of modern package design.

In contrast — *hard-to-read, uneven, "home-made" marking is a hindrance to your package or product from beginning to end* — and can actually waste thousands of dollars a year.

And a Markem marking method makes important "in-plant" savings as well. The right Markem machine, type and specialty ink working in your plant marks the *right* quantities at the right time — with savings in inventory, labor and delivery time . . . eliminates waste from obsolescence . . . handles "short runs" rapidly and economically . . . provides flexibility that allows *one machine to do a variety of marking jobs.*

Call your local Markem man or write directly, enclosing samples and requirements. Markem Machine Co., Keene 35, N. H.

MARKEM

everything industry needs . . . for profitable marking . . . since 1911

For more information circle No. 255 on Reader Service Card, Page 79

WHICH MARK IS YOURS?

M.S.M. CO.
149 CHURCH
NEW YORK
Bold, stencil marking complies with Marking Rule 6.
Tiny, typed address is difficult to read.
MARSH STENCIL MACHINE

FOUR SIZES:
1", ¾", ½", ¼"

"FREIGHT MUST BE STENCILED or otherwise durably and plainly marked" reads Rule 6, Marking Freight.

Do your shipments pass this test?

PLAINLY MARKED—can you read the address at 10 feet?

DURABLY MARKED—is the address weatherproof and permanent?

Careless marking costs shippers millions of dollars yearly, say railroads and truck lines. Proper marking would save this.

Try the Marsh Stencil Method on your shipments one week free. **Write for sample stencil of your name and 24-page booklet on proper marking.**

67

MARSH MARSH STENCIL MACHINE CO.
BELLEVILLE 34, ILL.

Pin to letterhead and mail for free booklet and sample stencil of your name.

NAME_____

TITLE_____

have a drive motor from ¼ to 1½ h.p., depending on products handled. Circle No. **169.**

Short Case Sealers

A-B-C Packaging Machine Corp. has a 4-page brochure on its Model XSA, a short, compact corrugated case sealer. Sealer is adjustable to range of box sizes and offers optional features, such as strip gluing, case counter, serial numbering head, and so on. Circle No. **170.**

Bundle Wrapper

Battle Creek Packaging Machines, Inc. has a 4-page catalog describing its Model 48 bundle wrapper. Pictures, drawings, and specification listings are included for this machine which can handle bundle operations within a variety of sizes at speeds up to 60 bundles/min. Items 6¼ to 12 in. long, 2 to 7½ in. wide, and 2 to 4¼ in. high can be accommodated on this machine. Circle No. **171.**

Bag Adhesives

H. B. Fuller Co. offers "Adhesives for bag manufacturers," featuring product descriptions on seam, bottom and band labeling pastes. Circle No. **172.**

Pressure-Sensitive Labels

Avery Label Co. has available an 8-page illustrated catalog covering its line of made-to-order pressure-sensitive labels which come in many shapes, sizes and colors, and on paper, metal, foil, film, and film laminates. Also covered is Avery's labeling equipment, including manuual and automatic dispensers and label imprinter. Circle No. **173.**

Package Tying Machines

B. H. Bunn Co. offers a catalog describing its nine different types of automatic tying machines. Handling packages that can be tied by hand, these machines wrap twine around the package to proper tension, tie a nonslip, double-loop knot and cut twine. Units adjust automatically to handle packages of varying sizes successively. Average tying time—less than 2 sec. Circle No. **174.**

Labeling Equipment

Pneumatic Scale Corp., Ltd. offers bulletin #140 on its McDonald-Type labeling equipment. For each of the eleven models covered there is an illustration, schematic drawing, description, specifications, and photographs of types of containers labeled. Circle No. **175.**

Gallon Filler

The Filler Machine Co. has available a bulletin on its G-59, a 2-line, piston-type filling machine. At a gallon a stroke, it fills from 20 to 40 gal.—min. with liquid, semi-liquid and semisolid products. It uses the bottom-up method and has a "no jar, no fill" device. Optional features are listed. Circle No. **176.**

Rigid/Flexible Foam

The Plastifoam Corp. offers a 4-page folder with samples of its rigid and flexible foam. "Rigid" gives shock, heat and water resistance and comes in any shape up to 8 ft. x 4 ft. x 20 in. "Flexible" has nearly the same properties but can also be rolled, twisted, or bunched like cloth. Circle No. **177** (End)

What a machinery adjuster should know—and do

(*Continued from Page 46*)

develop the knack of not putting on too much oil. If this happens, it can run down into machinery and, in certain instances, may come in contact with package or product. Without pinning this down to specific machines, the important point is to keep equipment oiled regularly and often.

DEVELOPING ROUTINES

Many routine changes and adjustments are necessary during a day's run. For example, on cartoning machinery it may be easy to get compression too tight. Adjusters have to watch this. If compression is too tight, it makes the glue ooze out and get on the belt. As a result, it accumulates on the belt, making the carton go in crooked. It is then necessary to loosen the compression unit, the carton jumps or jerks—often enough to make all cartons in the line fall over. If this happens, your only alternative is to reglue the cartons. Therefore, it is important to have adjusters watch this closely.

Another problem in this area is that the compression unit may not apply enough weight on the box. It is important to work towards an even seal. If there is a build-up of glue on the belt, they have to loosen it to avoid the jerking action mentioned above. This is all because of the carton going in crooked at the start.

All this drives home a main point: Be sure that packages enter machinery in correct position. The same is true of glue. There must be a correct flow without oozing or build-up.

In the course of routine changes of roll stock during a day, a good adjuster learns to make sure of proper register and of proper roll position. Hand in hand with this is the job of making the change quickly and efficiently. **He should anticipate these changes in order to be on hand at the instant needed.** Good machinery men learn to change rolls so quickly that very few packages "land on the table," as a result of not being able to move through machinery. It is important to hold these backlogs down by making the change as fast as possible.

Removing Jammed Cartons

When a jam or smash occurs, there is more involved than just stopping the machine and taking out the offending package. **Adjusters must work with their crews closely and watch for improper action on their part.** Sometimes people on the line pull a package into the clips (when the machine is stopped for a jam) or otherwise remove it so that it damages the machine.

Obviously (for safety reasons) they should never reach into a machine while it is running. There is the chance of their being hurt. Also important is the fact that **the**

For The **Right Size** Container Every Time . . .

Rite-Size BOX MACHINE

- *Eliminates* packing line slowdowns and shutdowns.
- *Converts* box storage areas into manufacturing space
- *Reduces* box inventory investment
- *Cuts* unit cost of packages

The Colt Rite-Size Box Machine is designed to make corrugated cartons *right in your own plant — as you need them.* It produces any size and style box you require, in small or large lots, quickly, accurately, and at lower cost! (A complete change in carton dimensions takes only a minute and one-half.)

With a Rite-Size Machine, box production can be coordinated with packing line requirements . . . to eliminate slowdowns and shutdowns due to carton shortages. Packaging is better, too, because cartons can be custom dimensioned to your products.

A complete box making department takes only 1600 square feet of space, *including storage.* Reductions in carton storage areas alone have resulted in floor space savings as high as 90% in many plants!

RITE-SIZE Box Machine is fully automatic and requires no special knowledge to run. Only one operator is necessary. Machine turns out 300 to 500 box blanks per hour.

Investigate the advantages of "in-plant" box making, today. There's no obligation. Write, phone, or wire for complete details.

COLT **PACKAGING MACHINERY COMPANY** 53 WASHINGTON AVENUE, CRANSTON 7, R. I.

machine may be damaged if they take a package out while equipment is in motion. They may damage four or five stations rather than just one. Thus, there is not only a safety, but also a machine angle to consider in the correct removal of damaged packages.

A closely related problem is the danger of spilling product into machinery when package jams occur. If products contain salt or some sort of concentrate, for example, their falling or spilling into machinery can be harmful. Therefore, adequate care is necessary. Some experts suggest keeping an air hose above machinery where this is likely to happen. When a jam does occur, it is possible to blow out the machine then and there without delay.

Following all of these precautions pays off. It is common practice in well-managed plants for packaging lines to run all day without losing more than twelve individual cartons. Simple arithmetic shows what a good efficiency condition exists where only twelve cartons are lost. Yet this is not "blue sky" but represents a realistic, attainable standard.

Machine Must Hold Package

Something important for a potential machine adjuster to remember is that **the machine action must hold the carton in steady position at all times.** For example, there is no place for any "free wheeling," or uncontrolled motion of packages going through an overwrapping operation. The only time the carton is anything like free is when it is being picked up for a succeeding operation. When this happens, it must move correctly. Without pinning down details of specific overwrapping machinery, the important thing is that where there are, say, elevators, the action must be just right so that the drop is correct and the carton is transferred properly.

If there is too much height, the drop is incorrect and the carton is thrown. As a result, there is a poor overwrap. The carton must be in steady position at all times. **If the adjuster can remember that a package is never permitted to "flow freely," he will develop a correct attitude toward the job of keeping this equipment in normal operation.**

Get Help From Crew

An underlying rule of the whole process is to **let the people on the line participate in the trouble-finding work.** To see how effective this is, simply watch a good adjuster go to work. He talks to the people around the machine, learns from them facts that otherwise might be obscure to him. It leads to helpful suggestions, it gives them a chance to broaden their activities, and it greatly shortens his working time on that job. This is extremely important because an important yardstick of how well he does his adjusting job is how short he can keep the interval of downtime while he is fixing a stopped machine. *(End)*

Controlled PACKAGING

Model AJ-1 PAK KING Automatic: universal-type filler for grated cheese, fine and coarse powders, soaps, cleansers, chemicals and drugs. Ideal for whole and ground spice and for small hard candies. Rated 35 to 70 per minute in a range from milligrams to 1 lb.

Write for Catalog 55 illustrating this filler and WEIGH RIGHT augers, volumetrics, elevating equipment and coupon inserters.

WEIGH RIGHT Automatic Scale Co.

WEIGH RIGHT AUTOMATIC SCALE COMPANY
JOLIET • ILLINOIS • U. S. A.

PACKAGING ?

ELLISCO CANS are specially suited for YOUR PRODUCTS

Square and Rectangular Cans 33 Base Sizes.

Round Screw Top Cans

Cans lithographed in your design and colors.

Round Slip Cover Cans. 5Z Diameters. May be tape sealed.

Seamless Slip Cover Cans. Write for Bulletin 116.

Packaging industrial products? Let us quote on your requirements. We are specialists in the manufacture of cans to meet your needs, and offer:

1 many standard and special sizes.

2 numerous types of cans: screw top, friction top, slip cover and tear strip—plain or lithographed.

3 small or large quantities.

4 familiarity with Military Packaging Specifications.

Write, wire or call for samples and prices.

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Circle No. 258 on Card, Page 79

Circle No. 259 on Card, Page 79

Oriented polystyrene sheet

(*Continued from Page 52*)

shaped blank through a heated die, then cooling the article while holding it in this shape. Articles formed by this method have a circular, or rectangular, flat bottom with crimped edges. Covers may be used for covering bottles and other containers in transit or storage. Trays are used as food containers.

There are limitations inherent in mechanical forming. The actual forming is accomplished by pulling, or pushing, the sheet through a relatively cold die which abrades the sheet giving a "mark-off." It is also impossible to obtain any degree of mold detail with a relatively cold die and cold sheet.

Although mechanical forming has limitations, it is a simpler, faster, and more economical operation than thermoforming. By mechanically forming two trays simultaneously in one mold, it is possible to produce 100 trays/min./mold. Scrap losses are reduced, since clamping is not required.

CONCLUSION

It has been pointed out that oriented polystyrene sheet, although not a new material, is suited to packaging foods and a multitude of nonedible items. In order for oriented polystyrene to break into certain packaging markets, it will be necessary to develop film coatings for use in packaging foods which require special protection.

Many containers are now being made by thermoforming; however, continuous research is being carried on to develop newer packages and more rapid production methods. Certainly research on oriented polystyrene has only begun; only a few applications have been explored—and perhaps the most rewarding results are presently in the design stages.

Literature Cited

(4) Aldington, E. T., Rath, P. S., and Tobia, A. M., "Trapped-sheet forming," *Modern Plastics*, 33 (1956), No. 7 (March). (*End*)

Are you ready for long range planning?

(*Continued from Page 63*)

solid ground as a basis for planning.

Even in its initial stages, a long range planning process proves helpful. A mere development of plans brings forth a wealth of information. It permits a careful review of things that might at first be dismissed on snap judgment. Without a conscious planning process the questioning attitude might not take hold. Experts in planning stress that the hardest part of the job is getting people to *do some thinking* about their operations and methods. It is hard to get them to make changes in their approach, but, as the planners observe, it has to be done.

The whole activity makes a staff sit back and look at its organization. Some times the real need is for a coordinating job. Executives point out that some of the country's famed organization builders

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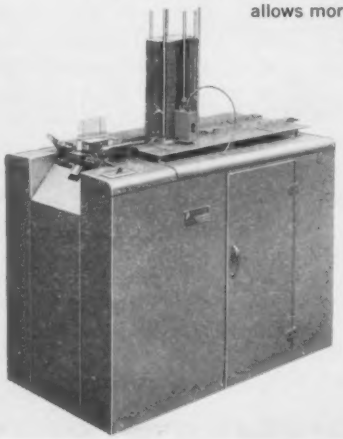
FOR SHORT RUNS OR CONTINUOUS PRODUCTION

The TUCK-O-MAT Model 50 is a reliable, general purpose carton set-up machine... a real workhorse of the cartoning line. Hundreds of installations prove that it offers more versatility, handles a wider range of carton sizes, allows more adaptations... all at speeds up to 75 cartons per minute.



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Model 518 L
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HEDWIN

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and top-management trouble shooters are really coordinators of long range planning. Their work comes down to establishing the priorities of various jobs to be done as a phase of an overall plan.

Fine For Small Firms

All this is by no means confined to large companies. **Planners say that the smaller the company, the easier it is to work out a long range plan.** Size has little to do with the knack of developing a future plan of operations. There are many different systems of organizing and recording the plans. Sometimes an outline is used, sometimes a more complicated recording system. Further, no one should expect to establish a plan overnight One expert warns that it took well over a year just to change the thinking of the key people in his organization to the point where they were receptive to planning, understood its objectives and were able to participate articulately in its process.

Many detailed programs now commonly accepted throughout industry (for example, statistical quality control) failed at first because key people did not understand them and did not realize that they would work. Those assigned to launch a planning process should have no illusions concerning the difficulty of hard going during the early stages of the job. At the same time, they have to be careful of applying a system to an unworkable application. It takes a lot of knowledge to find out what works out in practice and what does not.

Experience Comes Slowly

All this assumes that management has enough patience to let the key people develop experience. If the planning process is to succeed, the individuals working out the plans must have opportunity to acquire experience in the knack of planning. There are so many things, for example, in packaging operations, that are not blueprinted along these lines but need to be.

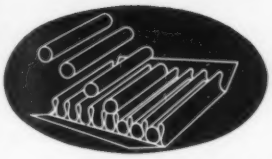
All in all, a long range planning process follows a sequence of orderly development, requires careful communication between individuals, gives every department or segment a broad gauge point of view and offers a definite basis for reducing generalities to specific terms.

But if boards of directors are to be prepared for packaging, production, and other expenditures over a long range span of time, careful planning is absolutely necessary. A suitable interval varies from industry to industry. In some, ten-year planning is reasonably practicable. In others, less than half of this interval is feasible. The point is that the planners must find out what is reasonable, say, for inventory, planning and maintenance. They have to take into consideration the different factors pertinent to a particular industry or product in order to work out an overall plan.

Focuses Responsibility

An important feature of it is that the use of a planning process ties a sense of responsibility, even liability to forecasting. Individual executives who make forecasts and have authority to back them up are committing production, top management, finance and other segments of the company. Even though constantly subject to change, these forecasts must be as accurate and as realistic as possible, if planning is to succeed.

A look at the work of an expert of long range planning makes it clear that such planning is no longer a luxury. It is rapidly becoming an unqualified necessity. Those responsible for the selection, purchase, installation, and operation of packaging machinery, equipment, facilities and all that goes with these, must start thinking in terms running well beyond the single-year budget, and must orient their thinking to careful and specific planning. The same is true of just about every other area of the company. Even companies just getting into long range planning find it is paying off. (*End*)



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"the pack with the built-in shock absorber"

MEETS MANY INDUSTRIES' DEMANDS for SAFE, ECONOMICAL HANDLING of Small, Delicate Articles

The basis of the RONDO system is the spring-clip holding action of its fluted partitioning, or RONDO-lations, which secure inserted articles by means of their restricted openings. At the same time, a cushioning effect is accomplished to protect against damage from sudden impact.

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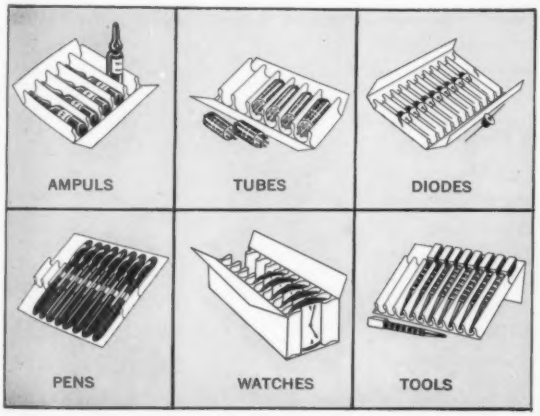

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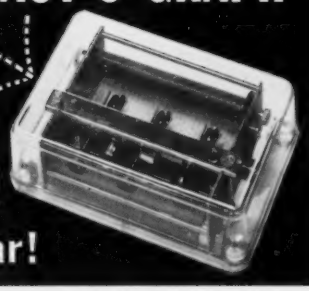

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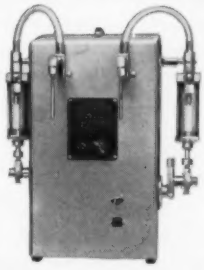

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Note No. 8:
Short-column crush test of corrugated board and its use in quality control

By K. Q. Kellicut,
Engineer,
Forest Products Laboratory,
Forest Service,
U.S. Department of Agriculture,
Madison, Wisconsin

Introduction. The column test of corrugated board in various modifications has been used to evaluate corrugated box material. In his early work on corrugated board at the Forest Products Laboratory, T. A. "Tac" Carlson used it to determine the buckling characteristics of long columns.

In recent tests of triple-wall corrugated board, the long-column test was used to show the effect of the moment of inertia on the buckling characteristics. The bending test, however, is generally more convenient to use, in that the specimen is simply supported rather than fixed by the ends. Because of this, few long-column tests have been employed here in recent years, while the short-column crush test has been used more and more frequently.

The short-column crush test was first used here about 10 years ago. The columns, about 2 in. high, were designed to fail in combined buckling and crushing. The ends of the column were cast in slotted wood blocks, which required considerable preparation time.

To simplify the procedure, the column was shortened to 1 in. and now is tested without end clamps. The failure is predominately one of crushing. The test is used as a quality control check on double-faced single-wall, double-wall, and triple-wall corrugated board as well as on solid fibreboard box material.

Short-Column Crush

The short-column crush test is simple to make; but, as for any sensitive, meaningful test, care is required in the preparation of the specimen. This is especially true in regard to the parallelism of the two edges through which the crushing force is applied. If the edges of the specimen are not parallel, or if the platens of the testing machine are not parallel in respect to each other, low crushing values will result.

It is also important to have the cut edges of the specimen square to the vertical column and without crushed material adjacent to the cut. Almost perfect specimens can be cut with a sharp, power table saw. Although specimens of almost any length can be used, one 6 in. long has been found quite satisfactory.

The specimens are cut to provide a column 1 in. high with the flutes perpendicular to the length. All of the component paperboards of the structure are then stressed across the machine direction to simulate the condition that exists for top-to-bottom loads in a conventional fibreboard box. The specimen is placed on edge on the platen of a testing machine and compressed at the rate of 15 (±5) lb./sec. until failure results. The maximum crushing load thus obtained may be divided by the actual length of the specimen to get a value of load per inch of length.

After the test is completed, the specimen is inspected for the type of failure. A typical crushing failure of a well-bonded specimen consists of hairline folds parallel to the length of one or both edges. This typical failure may be seen in Fig. 1 on the center specimen. It is a triple-wall specimen that appeared the same as the left specimen before it was tested and at-

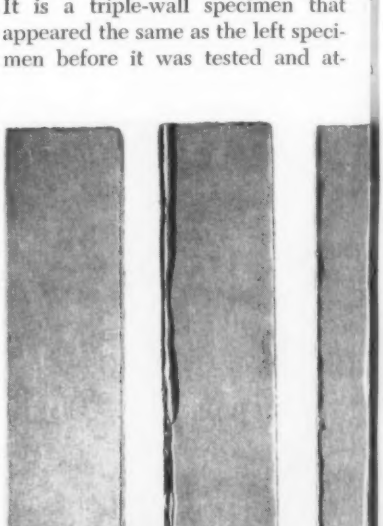

Fig. 1. Three short-column crush specimens of triple-wall corrugated board. Left specimen not tested. Center shows typical failure of well-bonded specimen. Buckled, bowed condition, right, caused by glue skip.

tained a load of 159.6 lb./in. The right specimen in Fig. 1, which was taken from the same lot, had an area of poor adhesion and tested only 131.6 lb./in.

The failure illustrated by the right specimen is typical for glue skips and excessively wide finger lines, and is readily apparent on the test specimen. These imperfections may be detected by the appearance, across the center of the column, of buckling and bowing in one or more of the liners.

Relationship With Basis Weight

The modulus of elasticity *(E)*, a physical property of the paperboards of the corrugated board, is reflected in the test results. For example, for corresponding weights, the boards with the higher *E* will yield the higher column-crush values.

The crushing test does not reflect the influence of the moment of inertia, as buckling is not involved unless there is a faulty bond. Therefore, A-, B-, and C-flute boards made from identical components and having the same quality of fabrication will yield essentially the same test values. The slight differences that will be found are due primarily to the different amounts of corrugating medium in the boards with A-, B-, and C-flutes, which in turn result in different weights for the boards.

The relationship between basis weight of boards and short-column crush values can best be demonstrated by the results of tests of 24 experimental A-flute boards made at FPL from paperboards manufactured here. All of the liners were made from the same lot of southern pine sulfate pulp. Liners of five weights were made, varying from 25.9 to 117.1 lb./1,000 sq. ft. The corrugating mediums were made from one batch of sweetgum neutral sulfite semichemical pulp in six weights, ranging from 9.8 to 53.2 lb./1,000 sq. ft. **The variation in the physical properties of the liners, as in the corrugating mediums, was primarily due to differences in weight.** The relationship between the total weight of these A-flute boards and the short-column crush values may be seen by examining Fig. 2.

Fig. 2 also shows that B-flute, C-flute, double-wall, and triple-wall boards, made from essentially the same components as the 24 laboratory boards, will fit the curve fairly well.

It would be found, however, that, if the crush values for boards made from entirely different components were plotted on this same figure, they would not fit the curve. For specific weights, those with a higher *E* would be oriented above the curve, while those with a lower *E* would fall below the curve.

Relationship Of Crush Values To Moisture Content

The short-column crush specimens are conditioned in an atmosphere maintained at 73° (±3.4°)F. and 50 (±2) per cent relative humidity, after which they are measured for height, length, squareness, and parallelism. When the technique is used to evaluate fibreboard that has been treated to increase wet strength, or for checking the effectiveness of waterproof adhesives, other conditioning atmospheres are employed. Generally, they include for these applications, in addition to the test of controls in the standard atmosphere, one maintained at 80°F. and at a humidity of 80, 90, or 97 per cent. In some instances the specimens may even be soaked in water before test.

The short-column crush test was used in a recent preliminary evaluation of three newly developed commercially made fibreboard materials treated to withstand the high moisture conditions involved in shipping fresh fruits and vegetables. For these evaluations, sets of randomized specimens were conditioned in at least two of the five atmospheres listed in the previous paragraph.

It was found that, for a specific atmosphere, the treated boards generally did not attain as high a moisture content as untreated fibreboards; although a specific increase in moisture content reduced the crushing strength of the treated boards by the same percentage as a corresponding increase in moisture content will reduce an untreated board.* The fact that they absorbed less moisture than the untreated boards for a specific condition, and did not delaminate under the higher moisture conditions, indicates they are more suitable for their intended purpose than untreated fibreboard boxes.

(Turn Page)

*Kellicutt, K. Q., Landt, E. F., and Setterholm, V. C., *Basic design data for the use of fibreboard in shipping containers* (Madison, Wisc.: U.S. Forest Products Laboratory), Report No. 1911.
——— *Basic design data for the use of fibreboard in shipping containers—Box strength calculator* (*ibid.*), Report No. 1911-A.

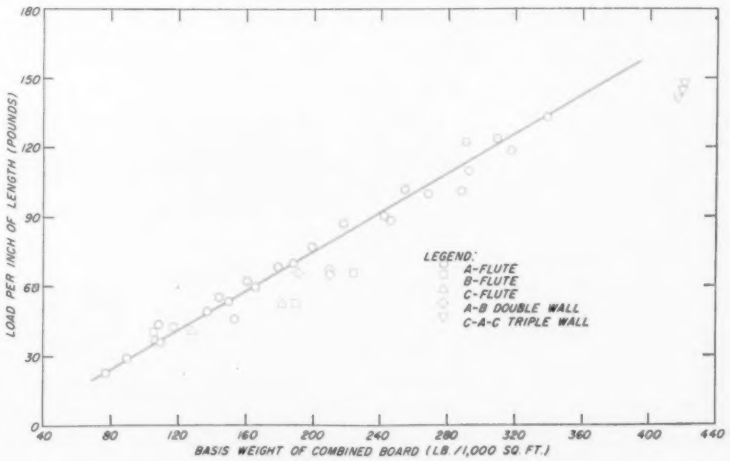

Fig. 2. Relationship between weight of board and short-column crush values for various kinds of corrugated fibreboard.

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Some short-column crush values for three treated boards conditioned in various atmospheres are given in Table I.

The short-column crush test has several desirable attributes. Its potential warrants investigation by a greater number of manufacturers as well as users of corrugated fibreboard boxes.

Some of these attributes and reasons for encouraging its use are:

1. The test is relatively simple to conduct.
2. It can be made on small-capacity compression testing machines.
3. Its use and reliability are not limited to single-wall structural material, since it can be used for double-wall as well as triple-wall material.

TABLE I

Short-Column Crush Values For Three Corrugated Fibreboards Treated To Increase Wet Strength And Exposed To Various Humidity Conditions

Board Identification	Conditioning Atmosphere		Moisture Content	Short-Column Crush
	Temperature (°F.)	Humidity (%)	(%)	(lb./in.)
1	73	50	9.3	56.9
1	80	97	25.5	18.3
2	73	50	...	87.7
2	80	90	...	47.9
3	73	50	5.3	50.5
3	80	80	9.8	40.4
3	80	90	14.2	28.7
3	80	97	22.8	18.2
3	Soaked in water for 24 hr.		68.0	9.8

4. Its values correlate with weight and kind of component paperboards of the structural material.
5. The test is sensitive to quality of fabrication.
6. It reflects the influence of moisture content on the compressive strength of boxes. (*End*)

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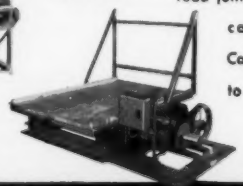

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What we think

Be your own consultant to hike your line efficiency

Have you thought of being your own consultant and of standing back long enough to take a detached view of your own packaging operations? Often the chief asset of a consultant is an outside viewpoint. He looks at operations objectively, without the distortion of outlook inherent in being too close to them. Without arguing the pro's and con's of his effectiveness in reaching this goal to everyone's satisfaction, we do say that such is his objective.

We urge you to try being your own consultant because we are hearing more and more that companies no longer can afford avoidable or preventable losses in efficiency. The ravages of inflation and the skyrocketing of costs, labor and otherwise, are eroding away the plateau of comfortable margin on which many a manager has been resting.

Are you as efficient as you think you are?

Almost any plant can better its efficiency. Most production standards will bear improvement—as alert managers everywhere readily testify. A few minutes' reflection usually provides all the impetus you need to goad you into looking for ways to boost efficiency. Just think, momentarily, of your factory burden, fixed costs, direct labor charges, and so on.

And let's be sure we include fringe benefits. Leading executives remind us these now run as high as 90 or even 97 cents an hour. Have you stopped to examine your fringe benefit costs? Do you really know what your fringe benefits are? They may well influence your decision to mechanize some line or help you justify a machine purchase.

All this challenges one to improve efficiency. Three steps in doing this include (1) being sure you know just what your packaging lines are doing, (2) improving your ways of systematically analyzing your own operations, and (3) learning to pinpoint your particular troubles or deficiencies.

One packaging machinery expert has often said that "analysis breeds paralysis." He is right—if the analysis fails to stir one to action. Much analyzing and studying is wasted because nobody does anything about the findings. We strongly urge taking affirmative steps to correct what you find wrong.

Some of these warnings are so obvious that seasoned plant executives wonder why we bother voicing them. "We've always done these things and we're always looking for ways to cut costs," they tell us. Unfortunately their diligence is not universally present. No one wants to operate with deliberate inefficiency, but what happens is that packaging lines and methods adjust haphazardly as new or modified packages find their way into our production patterns. An inefficient operation "just grows" so casually and seems so natural that we hardly recognize its shortcomings.

So, learn more about your efficiency and strive to improve it. Production experts warn us not to be lulled into security by "cost standards," which usually rest on a different basis than "production standards." They tell us to spend more time studying efficiency reports, learning what causes stoppages and poor operation. These reports may show, for instance, that a costlier packaging material is preferable to a cheaper one because of its superior, trouble-free performance on the line.

Checking your line efficiency may shock you

Sometimes we forget that, say, a 10 per cent decrease in efficiency means four hours of lost production when you are running a 5-member crew 40 man-hours a day. When we take the number of packages producible during the number of minutes the line is running, divided into the actual yield of packages, and thus get our efficiency, we sometimes are surprised. It often proves highly profitable to be surprised frequently or startlingly enough that we track down the trouble and do something about it.

A key to all this is having correct information. Do you know exactly what speeds your lines run? The exact downtime? The precise time intervals during which the crew was assigned to the line (and hence, standing around idle while mechanics adjust machines) in contrast to time it was assigned to other work off the line—such as during major overhauls? Can you distinguish "normal" losses from exceptional ones? Your answers to questions such as these show whether or not you need to be your own consultant.

Bruce Hollingren

Editor

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Packaging Institute's 21st Annual National Packaging Forum

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U.S.I. POLYETHYLENE NEWS

A series for plastics and packaging executives by the makers of PETROTHENE® polyethylene resins

SEPTEMBER, 1959 — U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation — 99 Park Ave., N. Y. 16, N. Y.

Packaging Notes

New polyethylene bag-making machine is capable of sealing polyethylene film up to 10 mil thick. The machine reportedly has better temperature control instrumentation than conventional machines. Sealing bar pressure is controlled pneumatically. Control of pre-dwell, dwell, and post-dwell times is by separate timers and the film is sealed in a completely relaxed state.

The machine can convert both blown tubing and flat film into bags. Its production rates are said to be comparable to other bag making machines.

Wafer-thin snap fasteners for polyethylene envelopes are now finding use in packaging retail soft goods. The fastener keeps the package closed, protecting the product, yet allows the customer to inspect the packaged product.

Freeze-it-yourself popsicles packaged in polyethylene-coated cellophane are now on the market in some parts of the country. The popsicles are sealed in pouches in liquid form for freezing at home. After freezing, the popsicles may be separated from each other and eaten by squeezing them out of the pouch. No sticks are needed. The film, cellophane with a 2-mil coating of polyethylene, is supplied in both printed and unprinted webs, generally four across for twin popsicles. The cellophane is printed before coating with polyethylene, locking in the printing.

Label adhesive for plastic surfaces is said to stick where average adhesives will not hold. It reportedly replaces pressure sensitive adhesives, which are slower and more costly to apply.

The adhesive is waterproof and permanently flexible. It will adhere to polyethylene, yet can easily be removed. The adhesive is applied by brush or automatic machine.

Polyethylene toothpaste tube has been developed. It is produced by an extrusion-injection molding method. A special coating is said to guard against loss of flavor and essential oils by permeation.

New flexible polyethylene bag with a sealed-in plastic tube serves as a "drink-from-the-package" container for fruit and vegetable juices, milk, soup, and soft drinks. The ready-to-use container simplifies disposal problems, speeds cooling, and is suitable for use in vending machines.

U.S.I. Develops Three New Resins With Improved Coating Properties

New PETROTHENE Resins Have Better Adhesion, Reduced Neck-in

U.S.I. has announced the availability of three new PETROTHENE polyethylene resins especially suited to paper coating. These new resins were developed in U.S.I.'s Polymer Service Laboratories and have successfully undergone extensive field testing.

The new resins show a marked improvement in adhesion to paper and other substrates. They also have shown reduced neck-in, smoking and polymer build-up at the die.

Neck-in, in particular, has been a troublesome problem in paper coating. It occurs when edges of the hot polymer web "neck" inward, carrying a thickened bead onto the paper. Neck-in results from a combination of resin properties and extrusion conditions. The new resins minimize the polymer's role in causing neck-in.

The resins are recommended for extrusion in the 575°-600°F. range, and cover a wide range of coating weights as shown in the chart at left.

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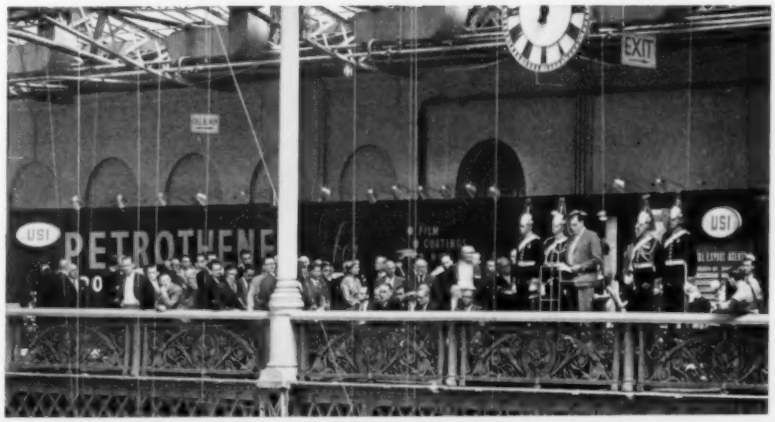
The single wrapped cup nests closer — saving about one-third of the storage space normally required. The cup is available in six and eight ounce sizes, with or without handles.

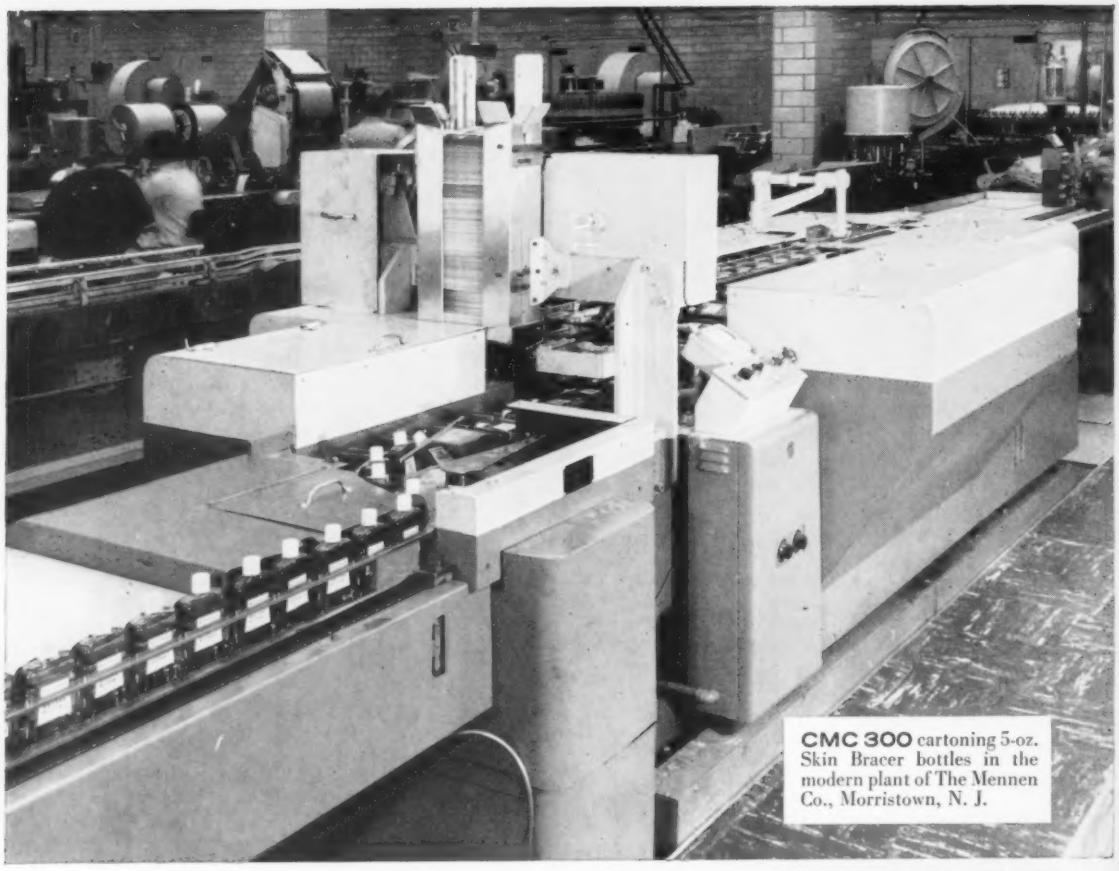
New Package For U.S.I. Electrical Grade Resins

U.S.I. electrical grade PETROTHENE polyethylene resins are now being packaged in fifty-pound bags made of 10-mil polyethylene upon request. The bags provide added protection from moisture for the carbon-black compounded electrical resins which tend to pick up water vapor from the air.

U.S.I. at the International Plastics Exhibition



U.S.I.'s booth at the International Plastics Exhibition was the background for the opening ceremony, June 17th in Grand Hall, Olympia, London. Above, the Exhibition is being addressed by The Right Honourable Reginald Maudling, Paymaster-General, who stands between trumpeters of the Royal Horse Guards.



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Cartoning at 300+ with the new Jones CMC-300

PROBLEM How to increase production to 200—300—even 400 cartons per minute without plant expansion—and to obtain additional savings in reduced labor and maintenance costs.

SOLUTION Successful, forward looking concerns like The Mennen Co. are anticipating these "facts of packaging life" by investigating and buying the new Jones CMC 300. It is designed to handle small and medium size bottles, tubes and other products, 180 to 400 per minute. It is equally justified on larger cartons at lower speeds.

The CMC 300 is not a superficially "souped-up" version of an old model. It is basically engineered to perform at 300+ with the same efficiency, and with less wear and maintenance, than older machines at 150 per minute. CMC 300 performance is based on:

1. Fundamental principles of product and carton handling.
2. The most durable and shock-proof power train ever employed on a cartoner.
3. A heavy, vibration-free cast iron frame.
4. Use of the finest materials and commercial parts.

If your product is cartoned in large volume, 300+ per minute is now practical and profitable—it will soon be an economic "must." Let us show you a Jones CMC 300 at our factory or in actual production. *See the CMC-300 in booth 414, PM & ME, Atlantic City, March 25-28.*

R. A. JONES & COMPANY, INC.

Cartoning Machines — Since 1903

P. O. BOX 485 CINCINNATI 1, OHIO

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